PINJANI, PRAVEEN, Ph.D. Diversity in Global Virtual Teams: A Partnership Development Perspective. (2007)
Directed by Dr. Prashant C. Palvia. 247 pp.

This study is an attempt to develop and test a comprehensive model for global virtual team (GVT) effectiveness based on development of collaborative partnership among diverse team members and the moderating role of collaborative technology and task. The conceptual model is based on traditional I-P-O framework for understanding GVT effectiveness. Team diversity in terms of surface level, functional, and deep level are treated as the central tenet of team inputs. Collaborative partnership elements are at the process level, moderated by task features and collaborative technology. At the outcome level, this study is more interested in GVT effectiveness as measured by team performance and individual team member satisfaction.

Results from a field survey of 58 GVT in various industries indicate three levels of diversity and confirm the moderating role of task interdependence and collaborative technology. Results do not confirm the moderating role of task complexity on the relationship between diversity and collaborative partnership. Results also confirm mediating role of collaborative technology on the relationship between diversity and GVT effectiveness.

DIVERSITY IN GLOBAL VIRTUAL TEAMS:

A PARTNERSHIP DEVELOPMENT

PERSPECTIVE

by
PRAVEEN PINJANI

A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2007

Approved by

_____
Committee Chair

To my wife and our families
For their patience, support and encouragement

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of The Graduate School at the University of North Carolina at Greensboro.

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Date of Final Oral Examination

ACKNOWLEDGEMENTS

There are many individuals who deserve my sincere appreciation for their support and encouragement throughout the achievement of this goal. First of all I would like to express my gratitude, respect and admiration to Dr. Prashant C. Palvia, chair of my dissertation committee, for his endless support, encouragement and valuable guidance without which I could have never fulfilled my dream of pursuing a doctoral degree. He always stood behind me as an academic leader and supported me whenever I needed him. He has managed to combine excellent overall guidance with detailed, incisive suggestions to my day-to-day challenges. Prashant has truly been an adviser extraordinaire. Thanks for putting up with me, and I hope we can keep this going for years to come.

I would also like to thank my committee members Dr. Ruth C. King, Dr. Hamid Nemati, and Dr. Kevin B. Lowe for their support and critical suggestions in shaping up my work. I could not have had a better committee. I will miss dropping in at your offices unannounced and swapping stories with all of you. I am also deeply indebted to all faculty members and graduate students at ISOM department, Bryan School of Business and Economics, UNCG, for having provided me with constant intellectual nourishment and warm comradeship.

Thanks are also in accordance to numerous managers at organizations and friends whose support and help, in more than one way, has made all this possible. Without their willingness and friendship, collecting the required data would have been a difficult task.

Special thanks are in order to Thomas May and other members of the ISOM department advisory committee for their support. I also owe a tremendous debt of gratitude to all the people here at UNCG who provided support for this project and made my journey towards my intermittent goals a pleasant one. So it is with a sense of sorrow that I bring this part of my life to an end, but also with the knowledge that every end is a new beginning. Also as a sense of joy and happiness that I came across such people and learned more than I gave. Whatever the future brings, I will not lose touch with UNCG.

As someone has rightly said "behind every successful man, there is a woman", *the winds beneath the wings*. For my loving wife, Nidhi, words are not enough and could not capture the amount of appreciation I have, for her continuous encouragement and being my motivational force right through the day I met her and it continues till today. She has always been there to pick up the pieces when I fell (literally) and could always make me smile no matter how dark the day has been. I love you.

Last, but certainly not least, I would like to thank my family for their overwhelming love and support. They are the guiding light in my life and there aren't enough words to convey the depth of my gratitude to them for all they have done in shaping up my career.

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CHAPTER I

INTRODUCTION

1.1 Introduction

The introduction of information communication technology (ICT) ranging from electronic mail to groupware has benefited numerous organizations in enhancing productivity, achieving better workflow management, and obtaining competitive advantage (Townsend et al. 1998). In particular, the development of computer-mediated communication (CMC) releases geographical and temporal constraints of communication and enables different parties to exchange ideas or messages across organizational boundaries. These developments in Information Technology (IT) have led, particularly in recent years, towards the development of new organizational forms that are flexible and responsive.

Over the past decade, companies have been continually challenged to effectively use every available resource to solve the gamut of ever increasing complex problems. Teams have become one of the most used, if not the most effective, ways to focus the human resource investments in the right direction. In 1993, 68% of Fortune 1000 companies reported that they used self managing teams, and 91% reported that they used

employee participation in groups, as opposed to in 1987 when only 28% and 70% were used respectively (Cohen and Bailey 1997).

Today's global economy requires many organizations to coordinate work across a variety of intra and inter-organizational boundaries (Lipnack and Stamps 1997). In today's business environment there is an increased pull from globalization and redefinition of markets, structural reconfigurations that emphasize horizontal and network linkages, change in the economic basis of competition, emphasis on knowledge and information over traditional production of industrial goods, and a shift towards consumer-driven planning. Correspondingly, there is a push from greater access and influence of information-related technologies in business environments. Global Virtual Teams (GVT) are perhaps one of the most fascinating direct result of globalization and the continuing proliferation of ICT (Zakaria et al. 2004).

During the last decade, we have witnessed that organizations are constantly expanding their operations and business to newer markets either through alliance, subsidiary, mergers or joint ventures. The pressure to "go global" has been fuelled by shrinking global boundaries, stiff local competition, ease of access to markets, and access to human resource and couple of other reasons. Businesses have also realized that boundaries, both geographic and organizational, are no longer an inhibitor to business progress and employees can work together on common projects to provide competitive advantage.

On the other hand, the advent of new communication technologies from email to advanced video conferencing, corporate intranets to groupware has immensely helped

organizations to fulfill their global aspirations and overcome time and space barriers. The new wave of advanced information technologies has provided organizations with immense opportunity to bring together dispersed work force from various locations.

Using new technology to work 'better, faster, cheaper, and smarter', many businesses are finding that global virtual teams can bridge these boundaries and provide a considerable competitive advantage (Lipnack and Stamps 1997; Townsend et al. 1998). In particular, GVTs allow organizations to improve efficiency and productivity, procure global expert knowledge from internal and external sources, and transfer 'best practice' information nearly instantaneously (Huber 1990). GVTs rely heavily on information technology and have very less face to face interaction. Also they have the ability to transcend some of the known barriers that exist in traditional teams like time, space, organizations and even national boundaries (Lipnack and Stamps 1997)

In multinational organizations, global teams increasingly make and implement important decisions. Reports indicate that more than half of all companies with over 5000 employees are using Virtual Teams (VT) and more than 60% of white collar workers participate in VT (Martins et al. 2004). Just as technology facilitated information transmission around the world, it now enables globally distributed people to collaborate on issues and challenges facing a company at the international level (Ives and Jarvenpaa 1991). These GVTs were almost unheard of a decade ago, but today they serve as a critical mechanism for integrating information, making decisions, and implementing actions around the world (Maznevski and Chudoba 2000). Virtual teams are increasingly seen as a new form of organizational structure given the growth of interorganizational

alliances and the adoption of advanced information technology (IT) for computer mediated communication (Schiller and Mandviwalla 2007).

According to a research report by Gartner Inc., in the year 2000, 40 percent of an employees time was spent working alone, 15 percent working with others in the same time zone and same place, 15 percent in a different place at the same time zone, and 30 percent in different place different time. The group predicts that by the year 2010, employees will spend 30 percent of their time working alone, 5 percent in same place and time, 25 percent in different place and same time, and 40 percent in different place and time. With half a billion people on the planet already online, the face to face aspect of normal working relationships is changing dramatically (Lipnack and Stamps 2000).

While GVTs offer a wide range of potential benefits to multinational organizations, implementations will be at risk if organizations fail to adequately address the many challenges present in the virtual context (Powell et al. 2004). Challenges are caused by barriers of distance and time zones, by language and cultural differences, by communication technology adoption and implementation, by too little or too much interaction, and by the development of trust and shared understanding among the team members (Lurey and Raisinghani 2001). Some team project failures have been reported (Kaiser and Hawk 2004) and calls for better understanding of GVT effectiveness have been made (Gibson and Cohen 2003).

1.2 Scope and Motivation for the Research

This research started with general interest in the area of application of information technology in various organizational aspects. Within the wide ranges of application of information technology, one aspect that holds great promise in the future is the application of information technology to enhance team work and bridge the challenges of space, time and location: Global Virtual Teams (Jarvenpaa and Leidner 1999).

This new phenomenon, GVT, has caused quite an exciting stir in the area of organizational studies. Information Systems and literature from other disciplines has given considerable attention to the area of GVT. Initial studies of GVTs emerged from the body of knowledge on traditional teams and traditional team effectiveness frameworks (Cohen and Bailey 1997) and from the theoretical perspective of interplay between IT and organizations (Desanctis and Poole 1994).

The concept of building high performance teams has been researched for several decades under various disciplines. The inter-personal relationships among the global team members, which are constructed through social networking patterns, have been considered as an important feature of the team building process. Research on socio-emotional process in GVTs has focused on relationship building in general, and more specifically on team cohesion and trust. Early work has established a positive link between socio-emotional process and outcomes of the GVT project, while also confirming that GVT face unique difficulties in achieving these processes (Maznevski and Chudoba 2000).

There are three areas that must be considered when designing a collaborative global virtual team environment: *people, process, and technology* (Powell et al. 2004). Organizations must be able to adapt to different work styles and cultures, leverage team processes, and utilize appropriate technologies to create efficiencies in the global workplace.

People

GVTs are a new organizational form and require organizations to change how they traditionally operate. GVTs connect people across organizational units whose policies, systems, and structures may not mesh easily with each other. They involve people from multiple disciplines, functions, geographies, and organizations to work together on particular opportunities (Maznevski and Chudoba 2000). GVTs cut across organizational cultures, national cultures, and functional areas, thereby increasing team diversity which may result in less effective performance (Watson et al. 1993). Members of the GVT have no shared history of working together, and need to develop their own approaches to work. Their members may lack the skills needed to work effectively with people quite different from themselves, and they have to deal with practical issues, such as working in different time zones and incompatible information systems (Bell and Kozlowski 2002). As these diverse GVT members communicate they tend to filter information through their inherent cultural biases, there by giving rise to a potentially broad range of misinterpretation or distortion (Solomon 2001).

Technology

Another major consideration to effective GVT functioning is the collaborative capabilities of the available technology (Townsend et al. 1998). It has been stressed that computer mediated communication in these virtual environments results in dehumanization of team interactions and social isolations which create a sense of social anonymity (Dubrovsky 1991). GVT can potentially bring together people with the needed knowledge and perspectives from different parts of the world to meet the desired objectives (Bell and Kozlowski 2002). Yet, the capacity of GVTs to achieve these objectives depends upon how effectively members work with one another and use available technology to collaborate. Simply creating a team and bringing the parties with the needed knowledge and skills together does not assure that the GVT will be effective. Although various technologies offer many benefits, difficulties with technologies can result in delayed communication, frustration, and decreased productivity and effectiveness. Members who are not competent at using certain technologies can present a further challenge to team performance and member satisfaction (Amison and Miller 2002). Therefore additional dimensions of technologies that are being used by GVT are required to increase collaboration and cooperation among dispersed team members.

Process

The notion that effective relationships between members of the team improve coordination, cooperation and consequently performance has considerable appeal in a broad range of contexts. Recent literature in GVT highlighted the importance of relationship building, cohesion, and trust as fundamental processes that foster team

effectiveness (Powell et al. 2004). Literature also points that GVT face significant difficulty in achieving these processes (Solomon 2001). To date, the majority of virtual team research pertaining to interpersonal processes has focused on conflict, interpersonal trust, group and individual identity, and group cohesiveness (Martins et al. 2004).

Despite a growing enthusiasm for teams, little empirical research exists that explores the socio-emotional processes inherent in the virtual work environment (Martins et al. 2004). Models that could be used to understand better team development and effectiveness have been limited to those based on the traditional co-located team perspective. Although GVTs have been well defined as a concept, only a limited number of studies have contributed to the understanding of the processes inherent in the assembling and maintenance of effective diverse GVT through use of collaborative technology and creating enabling relationships among team members aimed towards team effectiveness.

Thus considering this interplay of *–people, technology and process*, the purpose of this study is to design a normative framework to assist organizations in managing diverse GVT, with specific focus on understanding the impact of developing collaborative conditions for processes and technology among team members. In this regard, this research will aim at developing and empirically testing a comprehensive model for GVT effectiveness based on understanding the mediating role of collaborative partnership between diverse team members and GVT effectiveness. Further, the research will also aim towards understanding the moderating role of collaborative technology and task on the relationship between diverse team members and collaborative partnership.

1.3 Research Questions

Following from the above discussion, the aim of this dissertation is to provide a more complete rendering of the complex and dynamic nature that surrounds partnership development in a heterogeneous GVT. The GVT effectiveness, conflict, elements of collaborative partnership, the diverse nature of GVT, the moderating role of collaborative technologies and task interdependence are the primary issues that are discussed in this research.

The dissertation seeks to answer following basic question and sub-questions.

Primary question: How can a diverse GVT be made more effective?

Sub Questions:

1. What is the effect of member diversity on collaborative partnership in GVT?
2. What is the mediating effect of collaborative partnership on GVT effectiveness?
3. How does collaborative technology moderate the relationship between member diversity and collaborative partnership in GVT?
4. How does the task moderate the relationship between member diversity and collaborative partnership in GVT?

1.4 Definitions

Since the intention of this study is to examine GVT effectiveness, it is imperative that underlying concepts of teams, VT, and GVT are examined in detail. In order to do so, definitions from a number of sources are highlighted and subsequently an attempt is made to arrive at some understanding of differences among these concepts.

Before embarking on a study concerning GVT, the term "team" must be defined. Cohen and Bailey (1997) propose the following definition:

Teams:

A collection of individuals who are interdependent in their tasks, who share responsibility for outcome, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems, and who manage their relationship across organizational boundaries. (Cohen and Bailey 1997).

Virtual Teams:

Virtual teams are groups of geographically and/or temporally dispersed individuals brought together via information and telecommunication technologies (DeSanctis and Poole 1997; Lipnack and Stamps 1997).

Gibson and Cohen (2003) suggest three main attributes for VT (a) it is a functioning team – interdependent in task management, having shared responsibility, and collectively managing relationships across organizational boundaries, (b) team members are geographically dispersed, and (c) they rely on technology mediated communications rather than face-to-face interaction to accomplish tasks.

Global Teams:

An example of a new organizational form, where a temporary team is assembled on an as-needed basis for the duration of a task, and staffed by members from the far corners of the world (Miles and Snow 1986; Jarvenpaa et al. 1998).

Global Virtual Teams:

A temporary, culturally diverse, geographically dispersed, electronically communicating work group (Jarvenpaa and Leidner 1999)

Global Virtual Teams are groups that (a) are identified by their organization(s) and members as a team (Lipnack and Stamps 1997); (b) are responsible for making and/or implementing decisions important to the organization's global strategy (Gibson and Cohen 2003); (c) use technology- supported communication substantially more than face-to-face communication (Jarvenpaa and Leidner 1999); and (d) work and live in different countries (Maznevski and Chudoba 2000). As differentiated from a virtual team, a global virtual team differs not only in the degree of virtuality, but also in terms of their national and cultural background.

Figure 1. provides a graphical demonstration of how we can view GVTs in relation to local VTs and traditional co-located teams. This framework has been adopted from existing literature (Jarvenpaa and Leidner 1999). On one axis is the type of group differentiated on the notion of temporary and permanent. A temporary team is a team whose members may have never worked together before and who may not expect to work together again as a group. In contrast a permanent team is a team whose members have some history of working together and can expect to work together in future.

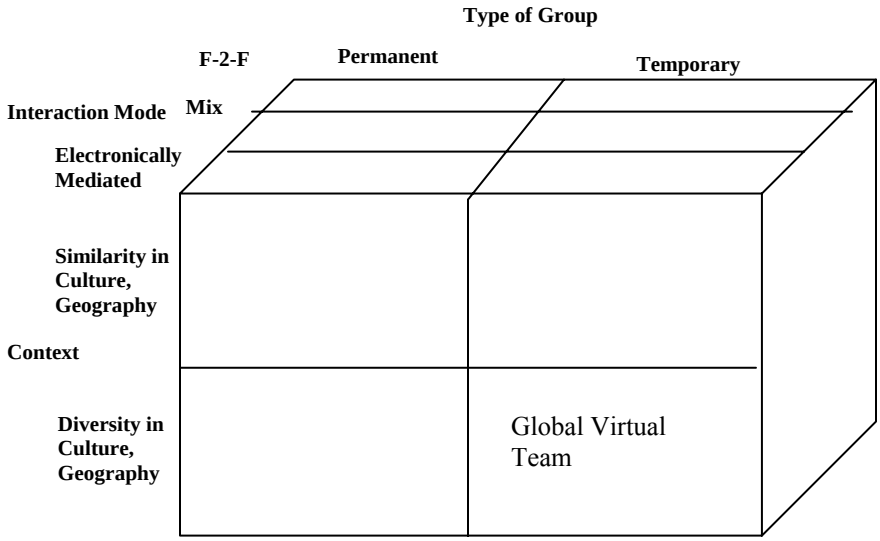

Figure 1. Global Virtual Teams – Definition (Jarvenpaa and Leidner 1999)

Further this framework places virtuality on another spectrum which differentiates teams from interacting completely with computer mediated or electronic medium with no face-to-face interaction to completely face-to-face and no computer mediated interaction. As virtuality increases, global virtual teams face new environment in terms of information acquisition, storage, interpretation, and dissemination, leading to increased difficulties and distinct challenges in relation to traditional face-to-face teams (Cramton et al. 2003; Malhotra et al. 2004).

The third aspect of GVT is the context defined as "a way of life and work in a specific geographical area with its own set of business conditions, cultural assumptions, and unique history". The characterization of virtual teams as global implies culturally diverse and globally spanning members who can think and act in concert within the diversity of the global environment (Jarvenpaa and Leidner 1999; Jackson et al. 1995 b).

1.5 Significance of the Research

1.5.1 Significance of Research to Practitioner

For practitioners, virtual teams are a hot topic, specifically in the IS development industry. They are a primary means for outsourcing or "co-sourcing" work (Kaiser and Hawk 2004). GVT promise to increase in usage in the future in this industry (Kaiser et al. 2004) and across many other industries as well (Kirkman et al. 2004), and they present many challenges, especially for leadership and technology use. With the advent of collaborative environments and the fundamental role of virtual teamwork, organizations are implementing global network infrastructures to generate more effective linkages for improved communication and productivity

In this research study, enabling collaborative capability among diverse GVT members has been examined from a strategic and conceptual overview through development of collaborative partnership among members and use of collaborative technologies. The building blocks of virtual collaborative environments—people, process and technology—represent the main components for sustaining successful GVT. Successful deployment of virtual teamwork through collaborative environments, therefore, is being recognized as a major step toward attaining a real-time corporate collaborative capability. In this regard, this research will help managers and organizations to make effective use of their diverse teams towards more collaborative outputs.

Taken as a whole this research will highlight the role of diversity in global virtual teams. It will provide insights into the building of collaborative environments, as bringing people from diverse backgrounds together to solve business problems or make business

decisions is key to enhancing team productivity and building human resource competency. This research will provide an understanding towards the impact of enabling collaborative partnerships among diverse global virtual team members and enabling partnerships through use of collaborative technologies. These insights will form best practices recommendations that practitioners can apply in their own global virtual teams. They will likely have implications for practitioners in improving training, better designing global virtual teams, identifying missing or unnecessary technology tools, and deciding how organizational policy could better support global virtual team performance.

The research study is intended towards bridging the gap between theory and practice, by providing concepts, techniques, and tools that will help organizations successfully design and operate diverse global virtual teams. The model may help managers to stop thinking about diversity as something that either "is" or "isn't", that is either "cognitive" or "emotional", that is either "good" or "bad". Managers may play a bigger role in shaping how issues are perceived by team members. They may encourage different identities to emerge thus fostering different perspectives, or they may play down different identities to develop collaborative partnership among team members and fostering a shared perspective of the team on company goals and objectives. In these ways, team performance can be improved. Further, managers may be able to reap more benefits of truly diverse global teams and implement appropriate collaborative technology for maintaining collaborative relationships.

1.5.2 Significance of Research to Academician

For academics in information systems (IS) and related fields, this research will yield three primary benefits.

First it will contribute to the understanding of diversity in global virtual teams from three different perspectives – demographic, functional and deep-level. Existing literature on diversity in global virtual teams is either non-existent or at a very initial stage. Calls have been made by numerous researchers to explore the dynamics behind understanding diversity and harnessing its advantages towards better team productivity (Powell et al. 2004; Martins et al. 2004; Connaughton and Shuffler 2007). This research will provide the basic groundwork for understanding different levels of diversity in global virtual teams, and the research model can be help refine and focus future research in this area.

Second, the introduction of collaborative environment development through partnership perspective will help researchers to focus on elements which are critical towards increasing effectiveness in global virtual teams. The importance of establishing member partnerships for advancing collaborative environments represents an initial step toward establishing a strategy for virtual collaboration and teamwork. This study will suggest important relationships to be studied in future research.

Third, there is evident lack of field studies in the area of GVT research. This research will make significant methodological contributions in this area which may help interested future researchers.

1.6 Overview of the Dissertation

This dissertation is divided into seven chapters. The first chapter introduces the topic of the dissertation and signifies its importance in present day's competitive business world. This chapter also lays the foundation for the scope and motivation for the research, stating the research questions, and defining the research topic. The latter part of the chapter is devoted to highlighting the significance of the research to both academicians and practitioners.

The second chapter reviews the current knowledge on teams and GVT from published resources. Differences among two streams of research are highlighted. The literature on collaborative partnership, diversity, and collaborative technology is reviewed and relevant theories on these concepts are presented.

A conceptual research model is developed in the third chapter based on the Input-Process-Output (I-P-O) model prevalent in the team literature. Relations among constructs are conceptually based and theoretical hypotheses are proposed.

Chapter four details the research methodology which is adopted for empirical validation of the research model. Sampling strategy, data collection procedure, instrument development, and pilot study are the main foci of the chapter. Results from the data analysis and hypotheses testing are presented in chapter five. Chapter six discusses the results in the light of their implementation in business environment and what implications these results have for present day GVT managers. Finally, chapter seven concludes the dissertation

CHAPTER II

LITERATURE REVIEW

2.1 Overview

As established in the previous chapter, this research study's primary objective is to design a normative framework to understand the GVT effectiveness with diverse members and the mediating role of collaborative partnership. Further, the research will also aim towards understanding the moderating role of collaborative technology and task on the relationship between diverse team members and collaborative partnership. Keeping these constructs in perspective, the purpose of this chapter is to explore the existing body of knowledge in these areas:

- Review existing literature on teams in organizations
- Review existing literature on virtual teams and global virtual teams
- Review theories and knowledge on collaborative partnership, collaborative technology and team diversity. Refine these constructs from theoretical and literature standpoint.

2.2 Introduction

A significant amount of research has been done on team and team structures and it has attracted researchers from areas of organization design, organizational theory, management and psychology. Since the beginning of the research on teams in organization, the focus has been on understanding the performance and effectiveness of teams. While there are disputes on many of the details, several general conclusions on the characteristics of a productive and effective team can be drawn. Multiple researchers have synthesized research on team performance (Guzzo and Dickson 1996; Kerr and Tindale 2004; Ilgen et al. 2005). Guzzo and Dickson (1996) provide a comprehensive literature analysis on teams in organizations and give special emphasis to factors that influence the effectiveness of teams in organizations. Ilgen, Hollenback, Johnson, and Jundt (2005), attempt to review the team literature from a perspective of understanding the mediating processes that affect team effectiveness and viability.

Similar Input-Process-Output (I-P-O) models of categorizing and synthesizing the VT literature have been developed and proposed in the IS literature (Martins et al. 2004; Powell et al. 2004; Hertel et al. 2005). Both Martins et al. (2004) and Powell et al. (2004) reviewed the literature from I-P-O perspective; where as Hertel et al. (2005) developed a five stage life cycle model for management of teams with high virtuality: preparation, launch, performance management, team development, and disbanding.

2.3 Teamwork in Organizations

Teamwork is a widespread and popular phenomenon. Many, if not most, organizations include work teams in one way or the other. For example, management teams, research and development teams, quality circles, sales teams, and project teams are widely existent.

The origin of research on teamwork for work productivity can be traced back to 1950's when in a shaft in the British coal mines, researchers of the Tavistock Institute of Human Relations in London brought to light a new kind of work design (Trist and Bamforth 1951). In the mines, the traditional small-scale work organization in close-knit groups had been replaced by the large-scale and depersonalized longwall method of coal getting. While studying the consequences of this Longwall method, Tavistock researchers came across an interesting phenomenon. Groups of workers had taken the initiative to reorganize their work situation in one that strongly resembled the traditional small-scaled group work. Such groups showed increased productivity, greater personal satisfaction and decreased absenteeism (Trist and Bamforth 1951).

These initial coal mine studies played a major role in initial research efforts on teams and group work in organizations. The concept of just what teams and work teams are has been in a state of dynamic change since the last 50 years. Research on teams and small groups have been a topic of interest to social psychologists in both psychology and sociology and to scholars in other social and behavioral sciences for the past century (for recent reviews, see Levine and Moreland 1990; McGrath 1997; Sanna and Parks 1997; Kerr and Tindale 2004). Although teams have been studied for many decades by various

disciplines, they did not become a major focus of organizational researchers until the late 1980s (Kline 1999).

Some of the first studies defined teams as collection of individuals based on primarily two characteristics: (1) that they must be intact social network of two or more people, and (2) that the individuals in this collection must be interdependent as the group shares a common goal (Bion 1961). The general definition of a work team or work group is ‘a group of individuals who see themselves and are seen by others as a social entity, who are interdependent because of tasks they perform as members of a group, who are embedded in one or more larger social systems, and who perform tasks that affect others’ (Guzzo and Dickson 1996). Katzenbach and Smith (1993) distinguished a team from a mere group of people with an assignment. They established a working definition: “A team is a small number of people with complementary skills, who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable".

Cohen and Bailey (1997) built on this foundational definition when they defined work teams as: *A collection of individuals who are interdependent in their tasks, who share responsibility for outcome, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems, and who manage their relationship across organizational boundaries* (Cohen and Bailey 1997).

Teams and teamwork have traditionally been described and studied in terms of classical systems theory, which posits that team inputs, team processes, and team outputs are arrayed over time. Almost every model developed to explain team performance (e.g.

Cohen and Bailey 1997) is grounded in McGrath's (1964) I-P-O perspective. The basic proposition of this model is that inputs such as structural characteristics combine to affect team processes, which in turn influence team outputs. In particular, team inputs include the characteristics of the task to be performed, the elements of the context in which work occurs, and the attitudes team members bring to a team situation. Team process constitutes the interaction and coordination that is required among team members if the team is to achieve its specific goals. Team outputs consist of the products that result from team performance. Thus, teamwork per se occurs in the process phase during which team members interact and work together to produce team outputs (Hackman 1990, Illgen 1999).

The body of research on teams contains a wealth of studies and considerable theoretical insight. The field has made great progress in mapping the relative strengths and weaknesses of individuals and teams on different types of tasks, and has developed strong theory and effective techniques of measurement for understanding the transformation of individual inputs into teams outputs, focusing on how inputs are combined with inter team and intra team processes leading to team's effectiveness.

Table 1. details some of the significant studies in team literature. A detailed review of team and related literature is beyond the scope of this research study and only a snapshot is provided for understanding the depth and width of the research on teamwork and teams in organization. As stated earlier detailed analysis can be found in various meta-analysis articles (eg. Guzzo and Dickson 1996; Kerr and Tindale 2004; Ilgen et al. 2005) published over time.

Table 1. Literature on Teams in Organizations

Dimensions	**References**
Team Inputs	
Team Size	Campion et al. (1993)
Heterogeneity (Diversity)	Makjuga and Baldwin (1991); Maznevski (1994); Jackson et al. (1995 b); Pelled (1996); Harrison et al. (1998); Pelled et al. (1999); Earley and Mosakowski (2000); Chatman and Flynn (2001); Polzer et al. (2002); Harrison et al. (2002); Bunderson and Sutcliffe (2002)
Familiarity	Goodman and Leyden (1991)
Empowerment	Kirkman and Shapiro (1997); Kirkman (1999)
Autonomy	Sundstrom et al. (1990); Campion et al. (1993)
Task	Argote and McGrath (1993); Stewart and Barrick (2000)
Leadership	Berdahl (1996); Yukl et al. (2002)
Team Processes	
Interdependence	Campion et al. (1993); Wageman (1995)
Cohesiveness	Smith et al. (1994)
Motivation (Social Loafing)	Karau and Williams (1993); Plaks and Higgins (2000); Beerrsma et al. (2003)
Trust	Dirks (1999)
Potency	Campion et al. (1996); Hecht et al. (2002); Gully et al. (2002)
Collective efficacy	Gibson (1999); Seijits et al. (2000); Gonzalez et al. (2003)
Conflict	Jhen (1994, 1997); Druskat and Wolff (1999); Jhen et al. (1999)
Transactive Memory	Austin (2003); Lewis (2003)
Bonding	Beal et al. (2003)
Shared Mental Models	Marks et al. (2002)
Team Outcomes	
Effectiveness	Hackman (1983; 1987); Gladstein (1984)
Satisfaction	Ancona and Caldwell (1992)
Team Learning	Ellis et al. (2003); Gibson and Vermeulen (2003)

Research on teams in organizations has covered a wide array of facets and variables to understand the effectiveness and success of teams. It has been pointed out that the research in organizational domain of teams has shown some shifts from questions of what predicts team effectiveness and viability to more complex questions regarding why some teams are more effective than others (Illgen et al. 2005).

Other facets of team behavior are still being debated and researched, as results of empirical research do not correspond sufficiently with each other, or new insights are being obtained from field studies which demand for more insights and understanding. For example, constructs like potency, shared mental models, transactive memory and bonding in teams are currently being explored (Illgen et al. 2005). Nevertheless, it can be said that there is an abundance of knowledge that can be applied in organizations in order to strengthen the effectiveness of teams within organizations.

While the underlying concepts of team based work remains relatively stable, certain business drivers have begun to alter the nature of teams as well as the way they accomplish their task. The growing popularity of inter-organizational alliances, growing tendency to flatten the organizational structure, increased globalization leading to coordination of activities that span geographical and organizational boundaries are some of recent considerations. Driven by these demands and advent of new ICT, new structures of teams are emerging to manage these challenges. In the next section, a general review of virtual team and global virtual team literature is presented.

2.4 Virtual Teams – Existing Literature

Virtual team research has seen a very rich set of publications since the early 1990s. In their review of current VT & GVT research, Powell et al. (2004) proposed the following literature taxonomy, based on the I-P-O model which has been a dominant framework in the study of teams (Martins et al. 2004): inputs, socio-emotional processes, task processes, and outputs. Figure 2. is representation of various concepts which interplay in GVT (Powell et al. 2004).

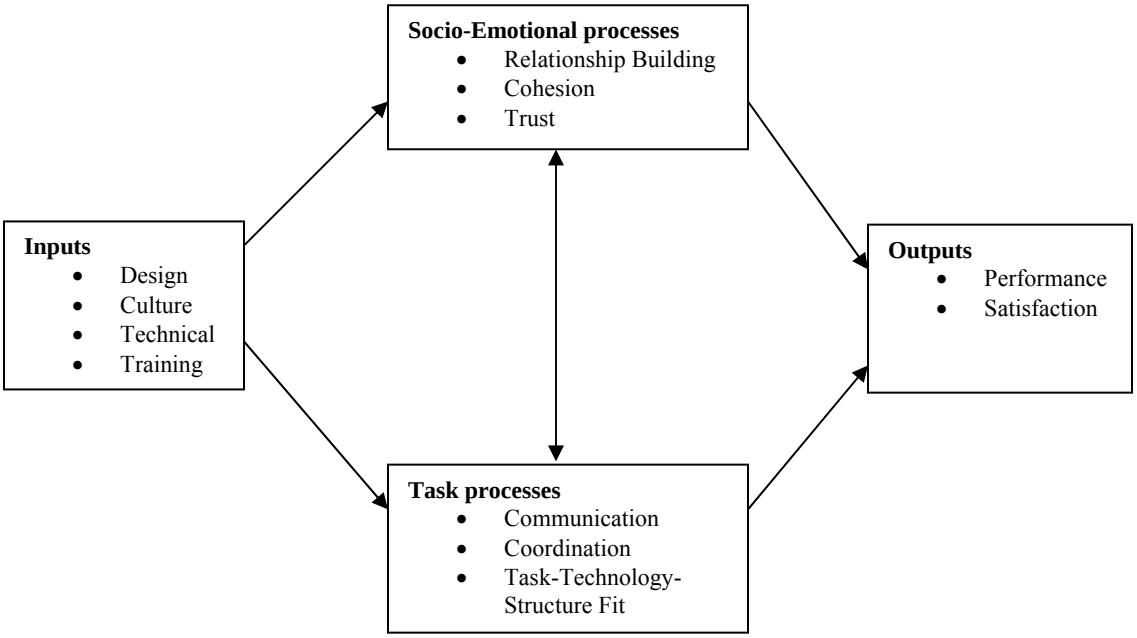

Figure 2.Taxonomy of Virtual Team Research. Adopted from Powell et al. (2004)

Table 2. details some of the significant studies on GVT and VT. An analysis of complete literature on virtual teams and global virtual teams is beyond the scope of this dissertation, and as a result only a snapshot of width and breadth of this research area is depicted.

Table 2. VT and GVT Literature

Dimensions	References
Team Inputs	
Team Size	Leenders et al. (2003); Riopelle et al. (2003)
Heterogeneity (Diversity)	Lind (1999); Bhapu et al. (2001); Nowak (2003); Carte and Chidambaram (2004); Paul et al. (2004)
Empowerment and Autonomy	Kirkman et al. (2004)
Task	Hertel et al. (2004); Rico and Cohen (2005)
Leadership	Kayworth and Leidner (2000, 2001-2002); Jhonson et al. (2002); Tyran et al. (2003)
Technology (New)	Saunders (2000); Pauleen and Yoong (2001); Baker (2002); Bell and Kozlowski (2002); Workman et al. (2003)
Culture (New)	Maznevski and Chudoba (2000); Zakaria et al. (2004); Janssens and Brett (2006); Zhang et al. (2007); Hardin et al. (2007)
Virtuality	Gibson and Gibbs (2006)
Team Processes	
Cohesiveness	Holton (2001)
Trust	Jarvenpaa et al. (1998); Jarvenpaa and Leidner (1999); Suchan and Hayzak (2001); Alge et al. (2003); Aubart and Kelsey (2003); Picolli and Ives (2003); Sarkar and Sahay (2003)
Collective efficacy	Mortensen and Hinds (2001)
Conflict	Montoya-Weiss et al. (2001); Hinds and Bailey (2003); Paul et al. (2004); Kankanhalli et al. (2006)
Motivation (Social Loafing)	Hertel et al. (2003)
Communication	Carlson and Zmud (1999); Robey et al. (2000); May and Carter (2001); Alge et al. (2003); Ahuja and Galvin (2003)
Transactive Memory	Griffith and Neale (2001)
Bonding	**Not Researched**
Shared Mental Models	Griffith et al. (2003)
Knowledge Sharing	Majchrzak et al. (2000); Malhotra et al. (2001)
Team Outcomes	
Effectiveness	Furst et al. (1999); Piccoli et al. (2004)
Satisfaction	Lind (1999); Tan et al. (2000)
Team Learning	Sole and Edmondson (2002)

Research on VTs and GVTs is still in an early stage addressing the many questions that exist (Martins et al. 2004; Powell et al. 2004). VT and GVT research has

examined a range of issues including factors affecting effectiveness (Furst et al. 1999), critical success factors in cross-organizational ad-hoc virtual teams (Lipnack and Stamps 1997), project management and success, knowledge transfer (Griffith et al. 2003), teams dynamics, communication, and outcomes (Maznevski and Chudoba 2000), trust (Jarvenpaa and Leidner 1999; Piccoli and Ives, 2003), learning in cross-functional virtual teams (Robey et al. 2000), socialization in virtual groups (Ahuja and Galvin 2003), and leadership effectiveness (Kayworth and Leidner, 2001-2002). Overall, the focus of GVT research has been on social issues (Malhotra et al. 2004) or team processes (Suchan and Hayzak 2001).

Some of the distinguishing features between the research on traditional teams and GVT have been based on the barriers being faced by GVT due to the change in the underlying concepts of dispersed work. While many of these challenges are present in traditional team environment and work settings, they become more pronounced in the virtual environment (Townsend et al. 1998). Some of the concepts which were focused with increased specificity in GVT are technology (Saunders 2000; Pauleen and Yoong 2001; Bell and Kozlowski 2002), culture (Maznevski and Chudoba 2000), and knowledge sharing (Malhotra et al. 2001).

Recent studies suggest that GVT are not simply an evolutionary form of collocated teams and they represent novel patterns of interactions and social exchange (Ratcheva and Vyakarnam, 2000). Changes in organizational structure and advances in information technology define the environment in which GVT operates, thus GVT

present management with new challenges in the form of team structure and technology (Staples et al.1999).

GVTs connect people across organizational units whose policies, systems, and structures may not mesh easily with each other. They involve people from multiple disciplines, functions, geographies, and organizations to work together on particular opportunities (Jarvenpaa and Leidner 1999). In contrast to traditional work teams whose members report to the same manager, GVT members report to different managers from different functions, disciplines, and organizations, which likely use different criteria for performance evaluation. The members have no shared history of working together, and need to develop their own approaches to work. Members of GVT may lack the skills needed to work effectively with people who are quite different than themselves and they have to deal with practical issues, such as working in different time zones and incompatible information systems (Kayworth and Leidner 2002).

Perhaps the greatest problem facing GVT is an inadequate understanding of team member's diversity as members hail from different personal, educational, geographical and organizational domains and developing cohesion among these members (Lurey and Raisinghani 2001) is a challenge. Consequently, there is a growing body of research which addresses the issues of improving collaboration among these diverse members in GVT (Griffith and Neale 2001, Carte and Chidambaram, 2004, Paul et al. 2004).

The notion that effective relationships between groups improve coordination, cooperation and consequently performance has considerable appeal in a broad range of contexts. Recent literature in GVT highlight the importance of relationship building,

cohesion, and trust as fundamental processes that foster team effectiveness (Powell et al. 2004). Literature also points that GVTs face significant difficulty in achieving these processes (Solomon 2001).

Henceforth, it is stressed that literature in the area of diversity in virtual teamwork and collaboration among these members is still at a nascent stage and just emerging in mainstream IS and management research. It is also evident from the literature that the impact of technology in developing collaboration among diverse team members is not fully explored.

Highlighting this knowledge gap, this dissertation focuses on such diverse and heterogeneous GVTs that include participants from different personal, organizational, national and cultural backgrounds. Furthermore, this study attempts to understand how cohesion and collaboration are developed among such diverse members and what role does collaborative technology and task play in building relationships among team members. The partnership development perspective is undertaken to understand the cohesion among diverse members towards GVT effectiveness. In the following sections, specific literature on collaborative partnership, collaborative technology, and diversity is explored.

2.5 Collaborative Partnership

Research in multiple disciplines highlight partnerships as patterns of cooperative interaction between independent actors (Anderson and Narus 1990; Lasher et al. 1991). Partnerships are viewed as "working relationships that reflects commitment, a sense of mutual cooperation, shared risks and benefits, and other qualities consistent with participatory decision making (Handerson 1990). The partnership concept as defined in the literature is based on the notion that performance can be significantly improved through joint, mutually dependent actions. Partnership provides the power to transform ordinary learning experiences into dynamic relationships, resulting in a synergistic process of accomplishment. The distinguishing feature of collaborative partnership is that relationship is as important as the outcome being sought.

2.5.1 Theory on Collaborative Partnership

Multiple theories have been influential in explaining the partnership concept in organizational domain. Prominent among them is the social exchange theory (SET) (Lee and Kim 1999).

Social exchange theory is one of the most widely used theory in sociology dealing with interpersonal interactions involving behavior, affection, products, and communications from the social psychological perspective (Blau 1964; Homans 1961). A social exchange is a relationship in which the participants have exhibited behavior in each other's presence on repeated occasions, created products for each other, or communicated with each other (Thibaut and Kelley 1959). SET views interpersonal

interactions from a cost-benefit perspective, considering these interactions as similar to an economic exchange, except that a social exchange deals with the exchange of intangible social costs and benefits (such as respect, honor, friendship, and caring) and is not governed by explicit rules or agreements. The major difference between social and the economic exchanges is that social exchanges give no guarantee that the reciprocal rewards in return will be equivalent to the cost invested. However, unlike in an economic exchange, there are no rules or agreements that govern the interaction. Therefore, the belief that the other party will reciprocate can only be established in a social exchange because each party feels obligated to maintain a cooperative relationship with the other party (Thibaut and Kelley 1959; Blau 1964).

2.5.2 Collaborative Partnerships in GVT

Research on teams and GVTs has highlighted the importance of building strong relationships and bonding among the team members to achieve outcomes (Illgen et al. 2005, Martins et al.2004). Research on building collaborative environment in GVT has been vexingly fragmented and limited to the understanding of trust and knowledge sharing (Hertel et al. 2005).

It is evident from the GVT literature that research has focused on individual aspects of collaborative partnerships. Table 3. details significant studies for the elements of collaborative partnership.

In this dissertation, we move towards rectifying these issues of collaboration by drawing on a cognitive model of team functioning. It is argued that the extent to which

an inter-group relationship is geared towards the development of collaborative partnership development among the members, the more effective and favorable will be the GVT's outcome.

Collaborative partnership among team members is viewed as an overall construct influenced by the following elements: mutual benefits, shared goals, mutual trust, shared knowledge and conflict. These elements exemplify collaborative learning; team members who are partners support each other and are not just invested in the outcome of the task. The partnership relationship empowers the members to achieve more than they set out to do so as individuals, thus creating synergies towards effectiveness (Handerson 1990).

Table 3. Literature for Various Elements of Collaborative Partnership

Collaborative Partnership Element	**Reference**
Mutual Benefits	Van de Ven and Ferry (1980); Lee and Kim (1999);
Shared Goals	Maznevski (1994); Sarkar and Sahay (2003)
Trust	Galeghar and Kraut (1994); Jarvenpaa et al. (1998) Jarvenpaa and Leidner (1999); Suchan and Hayzak (2001); Aubert and Kelsey (2003); Sarkar and Sahay (2003); Picolli and Ives (2003)
Shared Knowledge	Bhappu et al. (2001); Malhotra et al. (2001), Cramton and Orvis (2003); Griffith et al. (2003); Hinds and Bailey (2003); Raven (2003)
Conflict	Mortenson and Hinds (2001); Montaya-Weiss et al. (2001); Lind (1999); Paul et al. (2004)

2.6 Diversity

Considerable research has been conducted to understand differences in the development and performance of diverse teams in comparison to their homogenous counterparts (Carte and Chidambaram 2005). Much of the research effort in this area has been predicated on the belief that diversity in work teams can be leveraged (Williams and O'Reilly 1998). Research has suggested that, within a work group or team, diversity with respect to member's demographic backgrounds, functional expertise and cultural backgrounds can have a powerful effect on both member turnover within and from the team and on teams performance and member satisfaction (Pelled 1996).

Diversity in teams poses both opportunities and threats and empirical findings are mixed regarding the impact of diversity on team outcomes and performance (Kirkman et al. 2004). Diversity has been posited to have either a positive or negative effect on team outcomes (Pelled 1996). Organizational scholars considering the link between diversity in teams and the team's performance have generally concluded that the relationship is neither simple nor direct (Milliken and Martins 1996; Williams and O'Reilly 1998). In some studies, diverse teams outperformed homogeneous teams by bringing a broader array of knowledge and experience to the work at hand (Cox and Blake 1991). In others, homogeneous teams performed better by avoiding the conflicts and communication problems that often beset diverse groups (O'Reilly et al. 1989; Zenger and Lawrence, 1989). If managed properly, team heterogeneity can create a significant operational synergy, whereas mismanaged team diversity can become a major impediment to optimal

functioning because of intra-group conflict, miscommunication, and lack of trust (Watson et al. 1993; Jackson et al. 1995b; Jehn et al. 1999).

2.6.1 Theories on Diversity

A review of the existing literature depicts two competing theories of team diversity which have been predominantly employed to examine the relationship between member diversity and team performance. One being the similarity-attraction paradigm as proposed by Byrne (1971) and the other being cognitive resource diversity theory from the field of management as postulated by Cox and Blake (1991).

According to the former paradigm, homogenous teams are likely to be more productive then heterogeneous teams because of mutual attraction of team members with similar characteristics (O'Reilly et al. 1989, Wiersema and Bantel 1992). The heterogeneous teams are hypothesized to be less productive and have lower team cohesion because of inherent tensions and relational conflicts arising due to member differences (Milliken and Martins 1996).

Using the theoretical argument of cognitive resource diversity theory, researchers have argued that diversity in teams has a positive impact on performance because of unique cognitive resources that members bring to the team (Cox and Blake 1991). The underlying assumption of the value of diversity is that teams consisting of heterogeneous members promote creativity, innovation, and problem solving, hence generating more informed decisions.

Empirical evidence from research on team diversity has also produced mixed results. Some researchers have found diverse teams to be higher performing (Hambrick et al. 1996; Dailey and Steiner 1998) where as other scholars have found them to be lower performing in short run and equal in performance in long run (Harrison et al. 2002; Bunderson and Sutcliffe 2002).

2.6.2 Types of Diversity

The essence of teamwork is to coordinate diverse contributions and accomplish a goal that could not have been achieved by any of the contributors working alone (Maznevski 1994). Increase in organizational member diversity and need for integration of this diversity has spurred recent interest in organizational behavior research in this area.

Diversity is an umbrella term for the extent to which members of a team are dissimilar (heterogeneous) with respect to individual-level characteristics (Jackson 1991). Previous studies, examining the effects of diversity on team member's perceptions and attitudes have frequently taken a one-dimensional view and argued for or against homogeneous or heterogeneous teams (Lurey and Raisinghani 2001; Kirkman et al. 2004). Homogeneity and heterogeneity were considered as the opposite ends of the continuum. However, this one-dimensional view may not be warranted, given the variety of diversity factors that can come into play within global virtual teams. A team can be homogeneous or heterogeneous with regards to different diversity variables: national culture, functional backgrounds, gender, and others. As a result, examining the particular

mix of diversity variables seems to be an important criterion in assessing team effectiveness (Pelled et al. 1999).

In traditional teams, there has been a growing recognition that the paths linking work team diversity to team functioning and performance outcomes are complex (Harrison et al. 2002). Researchers in existing organizational and psychological literature have examined the impact of various forms or types of diversity existing in teams. Researchers have examined the impact of diversity in identity of group memberships, such as age, sex, or race, on reactions toward team level functioning and team performance (Milliken and Martins 1996). This type of diversity based on demographic differences has been defined as *Surface level* or *Demographic Diversity* (Harrison et al. 1998). Another form of diversity involves individual characteristics, such as idiosyncratic attitudes, values, and preferences termed as *Deep-level Diversity* (Ely and Thomas, 2001; Harrison et al. 2002). A third form of diversity that is investigated is *Functional Diversity*; it is the extent to which team members differ in their functional backgrounds. The underlying assumption is that different functional backgrounds imply non-overlapping knowledge and expertise, which suggests that team members have a broader pool of resources from which to draw in making decisions and taking action (Bunderson and Sutcliffe 2002). Diversity impacts team performance and outcomes in multiple ways and offers certain benefits by increasing the pool of resources (Ely and Thomas 2001).

2.6.3 Diversity in GVT

Research on diversity in GVT literature is mostly absent; though a few VT studies have examined cultural differences among team members (Powell et al. 2004). GVTs are likely to be diverse with regards to demographics, work-related experience, cultural background and overall knowledge skills (Bhappu et al. 2001). Researchers have focused on gender differences (Savicki et al. 1996) and cultural differences (Sarkar and Sahay 2002; Tan et al. 1998). Earley and Mosakowski (2000) examined the functioning of transnational teams in two confirmatory laboratory studies, primarily focusing on traditional teams, and they demonstrated that homogenous and highly heterogeneous teams outperform moderately heterogeneous ones in the long run. The authors observed that in the moderately diverse teams, some people were alike, and critical mass and its salience were ascribed to weaker performance in this group.

In examining gender, Lind (1999) found that compared to men, women in virtual teams perceived their teams as more inclusive and supportive and were more satisfied. Bhappu et al. (1997) examined the effects of communication dynamics and media in diverse groups, and found that individuals in face-to-face groups paid more attention to in-group/out-group differences in terms of gender than those in virtual teams.

A number of VT studies have examined the role of cultural differences among team members (Powell et al. 2004). National culture appears to affect interaction in GVTs such that members from individualistic cultures tend to challenge majority positions more than members from collectivist cultures (Tan et al. 1998). Jarvenpaa and Leidner (1999) argued that persons from individualistic cultures might be more prone to

trust than individuals from collectivist cultures because they show a higher willingness to respond to ambiguous messages. However, in an empirical study of cultural effects on virtual teamwork, they did not find any clear effects. Perhaps both collectivist and individualistic cultures have advantages for teamwork. The former might help to overcome isolation by seeking contact with remote co-workers, whereas the latter might help to cope with isolated work conditions (Hertel et al. 2005).

Prior research has also found that in contexts that reduce the effects of surface level diversity, deep level diversity has strong effects on the functioning (Martins et al. 2003). Carte and Chidambaram (2004) proposed a theoretical model for understanding deep level and surface level diversity and how capabilities of technology can be harnessed to leverage the positive aspects of diversity while limiting its negative aspect.

The existing literature points out that GVTs offer significant opportunity to overcome surface level or demographic diversity as most of the communication and interaction takes place through electronic medium. But because of their dispersed nature, organizationally and geographically, and inherent membership diversity, both cultural and functional diversity have significant impact on their effective performance and outcome. There is an apparent gap in the literature towards understanding of all three levels of diversity in effectiveness. This study is interested in examining the relationship between all three types of diversity and in the context of building collaborative partnerships among such diverse members in GVT. In particular, the focus is towards understanding how different types of diversity impact GVT effectiveness and how diversity elements can be harnessed through development of collaborative partnership.

2.7 Collaborative Technology

Global virtual teams must operate quickly and effectively across time and space. To do this, they need high levels of technological support. Technology has thus become absolutely critical for virtual teams carrying out basic team functions of communicating, decision making, learning, collaborating and managing knowledge.

Collaborative technology refers to a wide variety of electronic tools – including email, group support systems, intranets, groupware, email systems, video conferencing, and computer conferencing, etc. - used by members of GVT members to communicate with each other, coordinate activities and execute tasks (Carte and Chidambaram 2004) . With electronic technology, GVTs can work across time and space in ways that provoke the formation of entirely new ways of working and organizing (Townsend et al. 1998). These technologies are designed to support people working in teams in different locations and times. The support of technology can be related, both directly and indirectly, to decision-making and performing routine day to day operations.

Specifically, collaborative technology helps GVT with four processes. First, it assists a GVT in gathering and presenting information. Tasks in this process include storing, processing, and retrieving information. Technologies include electronic whiteboards and collaborative document management. Second, collaborative technology supports GVT by allowing members to show work to one another and share images with other members. Tools such as telephones, videoconferencing and shared whiteboards with electronic cursors can be used to convey such information. Third, technology helps teams with deliberations by enhancing their ability to brainstorm, solve problems and

make decisions. Fourth, collaborative technology also helps members of the GVT to form social relationships with other members. Technologies like email, phone, messenger, etc. are helpful in this regard.

The technology domain of a GVT is the range of ICT available to the GVT. ICT includes audio conferencing, email, personal communications devices such as phones and cell phones, scheduling/calendaring systems, groupware, and document management systems (Becker et al.1999; Quereshi and Zigurs 2001). The set of ICT available to a particular VT can aptly be termed a virtual team technology "toolkit" (Suchan and Hayzak 2001).

The type of technology used by GVT is an important consideration, as media richness has been found to positively impact team effectiveness, efficiency, amount of communication (Hinds and Kiesler 1995; Carlson and Zmud 1999; May and Carter 2001), the relationships among team members (Pauleen and Yoong 2001), and team commitment (Workman et al. 2003). The use of richer media also results in increased levels of performance and trust (Burgoon et al. 2003). Technology, such as video resources, has also been examined to improve teams decisions (Baker 2002).

ICTs may differ in their physical accessibility and reliability within a given global virtual team, and may also differ in their capacity to enable different communicative goals (Maruping and Agarwal 2004). Prior research has studied the use of technology for managing specific inter personal processes like socialization (Ahuja and Galvin 2003) and task related conflict management (Montoya-Weiss et al. 2001).

2.7.1 Theories on Technology Use

In order to be able to understand the use of collaboration technologies in organizations, one can essentially draw upon theories of information technology adoption and use in organizations. Drawing upon these IT use theories, IS researchers have examined various factors which influence use of collaboration technologies including task characteristics (Pinsonneault and Kraemer 1990; Maznevski and Chudoba 2000), accessibility (Rice and Shook 1988; Lou and Scamell 1996), top management support (Eder and Igbaria 2001), awareness of the potential and other technology characteristics such as complexity, and group supportability (Lou and Scamell 1996; Sarker et al. 2005).

A popular theory used to understand use of collaboration technologies has been the Adaptive Structuration Theory (AST) proposed in the early 90s. DeSanctis and Poole (1994) attempt to understand the adaptive structuration in organizations due to the use of advanced information technologies. The researchers argued that differences in people's adaptation to computer use, and the consequent effects on decision making and other outcomes is a result of interplay between the two types of structures: social structures embedded in the technology and those set in the action. Such evolution of use, they claim is achieved through "learning".

Carte and Chidambaram (2004) proposed a capability based theory of technology deployment in diverse GVT. Based on an extensive review of three research streams – group diversity, group development, and collaborative technology – they developed an integrated model of ongoing team interaction that described how the purposeful deployment of certain collaborative technology capabilities can help leverage the positive

aspects of diversity while limiting its negative aspects. They viewed technology from a "bundle of capabilities" perspective signifying reductive and additive capabilities. Reductive capabilities encompassed features like visual anonymity, equality of participation, and synchronous interaction. Additive capabilities included coordination support, electronic trail, and, enhanced capabilities like image and file transmission

2.8 Summary of Findings

GVT literature has made considerable progress in past 10 years (Powell et. al., 2004). Inspite of the breadth and depth of the constructs, issues, and dimensions explored, calls for specialized research in this area have been made.

Based on the above literature review, findings suggest that:

- Research on GVT is fragmented and much of the focus of this research has been on comparisons of traditional teams with GVT.
- Research on diversity on GVT is still at a nascent stage and lacks empirical evidence.
- Focus has been on treating diversity as an individual construct without understanding the various facets or types of diversity present in GVT.
- Research on relationship building in GVT and its effect on team effectiveness has looked at isolated constructs without understanding their combined effects. Elements of collaborative partnership – mutual benefits, shared goals, mutual trust, & shared knowledge, are scantily researched and a more in-depth and holistic understanding is still lacking.

- The role of collaborative technology in moderating the relationship between diverse team members and relationship building has not been fully explored and lacks empirical validation.

CHAPTER III

RESEARCH MODEL

3.1 Research Model Foundation

Given the inherently complex nature of GVT environment, it is argued that GVT effectiveness will be a function of development of collaborative partnership among the diverse team members. As illustrated in Figure 3., an I-P-O model based on McGrath's (1964) perspective is the dominant way of thinking about group performance (Guzzo and Dickson 1996).

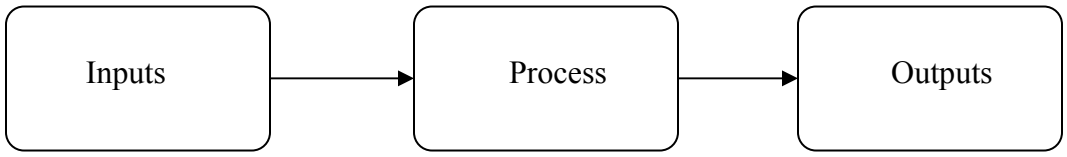

Figure 3. Input –Process – Output Model for Team Performance.

Inputs refer to things that team members bring to the group, as well as the context in which the team operates. Main inputs are task design, team characteristics, organizational context and supervisory behaviors. Process refers to "members' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioral activities directed toward organizing task work to achieve collective goals" (Marks et al. 2001). Outputs refer to team effectiveness, and include things such as

performance, the satisfaction and attitudes of group members, and their behavioral outcomes This basic I-P-O model is also the basic model for understanding GVT effectiveness and processes (Powell et al. 2004).

Recently, in team literature there has been a growing recognition towards understanding the role of moderators (Illgen et al. 2005). A careful review of the team and VT literature identifies the following four conceptually based moderators: (a) team type, (b) team size, (c) task, and (d) frequency and duration of interactions (Powell et al. 2004).

A variety of teams are employed in organizations, and researchers have emphasized the distinctions among them while arguing that team types can potentially moderate the effectiveness of teamwork (Cohen and Bailey 1997). Reflecting diverse teams utilized in today's organizations, different typologies of teams exist in the current literature. Cohen and Bailey's (1997) proposed three types of teams (a) work teams, (b) project teams, and (c) management teams. GVT can be primarily formed with any type of team but they are most prevalent at the project level (Martins et al. 2004). Since the focus of this study is GVT in general, it is argued that team type will not be a potential moderator. Team size will be used as a control factor as consistent with prior research in this area (Ancona and Caldwell 1992).

Thus out of the four moderators, only two are important in the context of this study – task, and frequency and duration of interactions. If task is the link that holds conventional teams together, communication and collaborative technologies serve as an additional bond linking the members of GVT (Rico and Cohen 2005). They allow GVT

members to communicate and share data and information despite disparities in location and time-zone. In this way, they become the key channel for interaction in GVT (Bell and Kozlowski 2002). Thus, collaborative technology is included as a moderator instead of frequency of interactions as these technologies are the primary means of interactions in GVT. Thus with the inclusion of the moderators, the research model is modified and depicted in Figure 4.

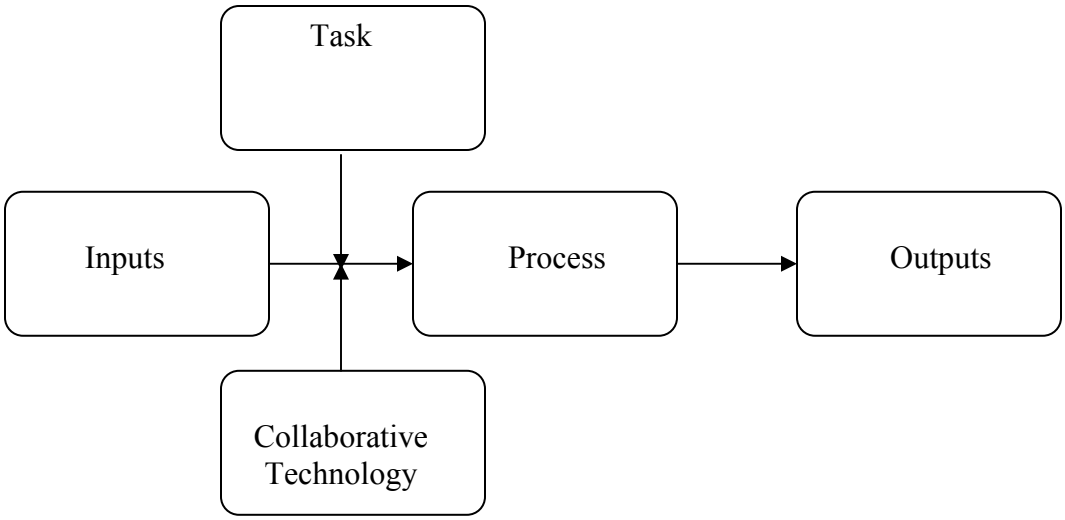

Figure 4. Inclusion of Moderators in the Research Model

In order to narrow the scope of this study and focus on the research questions, this dissertation will concentrate on team diversity as the central tenet of team input. Existing research on team diversity has identified three levels of diversity (Harrison et al. 2002) – surface-level diversity, deep-level diversity and functional diversity. At the process level,

this dissertation will examine the development of collaborative partnership among the team members. The various elements of collaborative partnership as identified in literature include - mutual benefits, shared goals, mutual trust, shared knowledge and conflict. At the outcome level, this study is more interested in GVT effectiveness, consistent with operationalizations as advanced by Hackman (1983) to include both team performance and members' satisfaction with the team. A detailed research model which is adopted for this study is depicted as Figure 5. in the next section.

3.2 Proposed Conceptual Research Model

Figure 5. depicts the research model for this study. The relevant literature and conceptualizations of the variables and the propositions derived from such review are examined in the following sub-sections.

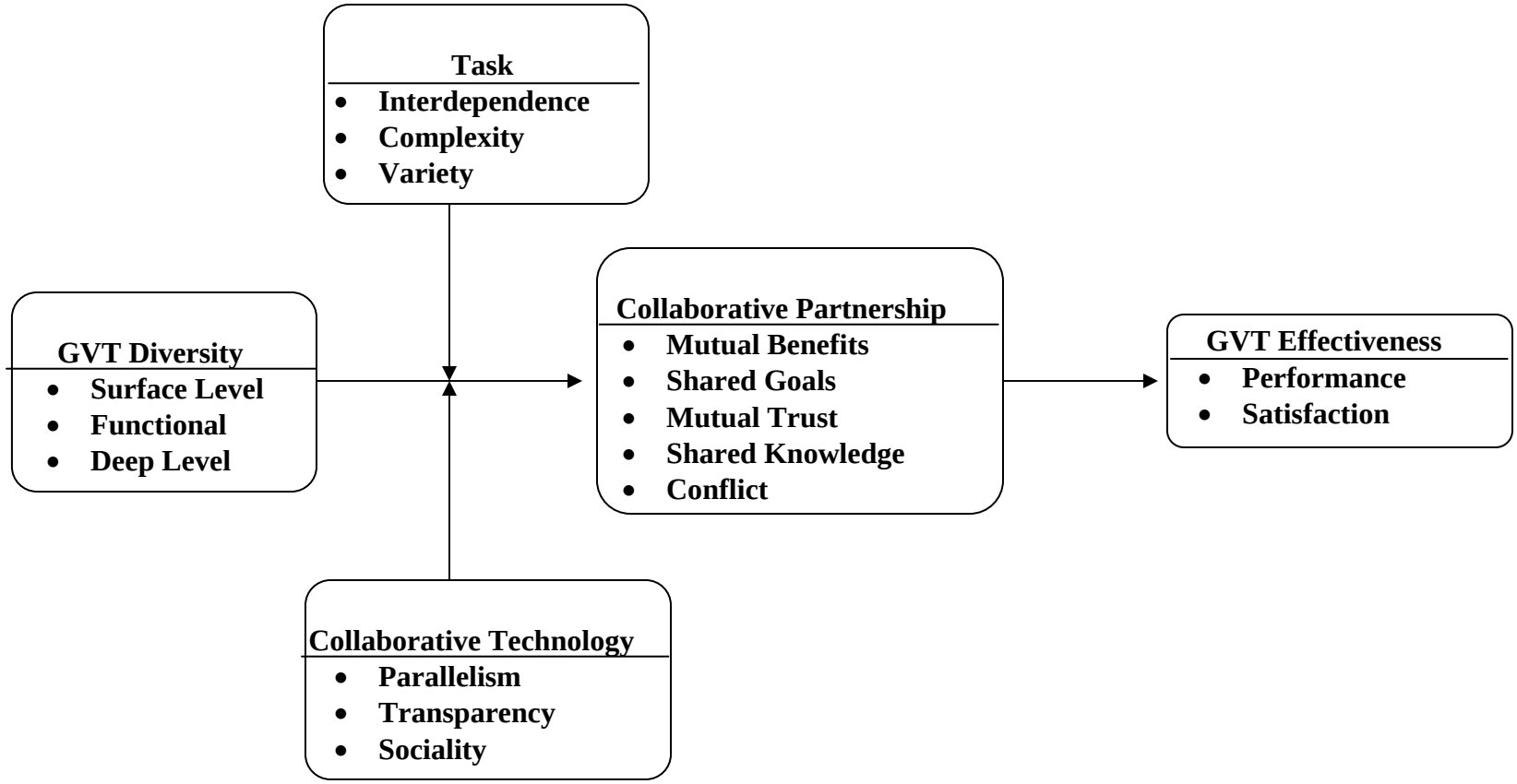

Figure 5. Conceptual Research Model

3.3 GVT Diversity

The increase in organizational member diversity and the need for integration of diversity has spurred interest of organizational behavior research in this area. The essence of teamwork, in general, is to coordinate diverse contributions and accomplish a goal that could not have been achieved by any of the contributors working alone (Maznevski 1994).

In traditional team literature, there has been a growing recognition that the paths linking work team diversity to team functioning and performance outcomes are complex (Harrison et al. 2002). Researchers in existing organizational and psychological literature have examined the impact of various forms of diversity existing in the team (Kerr and Tindale 2004). Researchers have examined the impact of diversity on the identity of team memberships, such as age, sex, or race to reactions toward team level functioning and team performance (Milliken and Martins 1996). This type of diversity based on demographic differences has been defined as *Demographic Diversity* (Harrison et al. 1998). Another form of diversity researched involves individual characteristics, such as idiosyncratic attitudes, values, and preferences which are termed as *Deep Level Diversity* (Harrison et al. 2002; Ely and Thomas 2001). Also significant research is in the area of differences in education, expertise and functional area, which is termed as *Functional Diversity* (Bunderson and Sutcliffe 2002)

Pelled (1996) expanded the team diversity literature by categorizing diversity into two major themes: highly job-related and less job-related attributes. Job relatedness was operationally defined as the extent to which the attribute reflects experience, skills, or

perspectives pertinent to cognitive work tasks. Pelled used her analysis to argue that highly job-related attributes such as functional expertise, education, and industry background have a stronger impact on team performance than less job-related attributes such as gender and ethnicity.

From the various taxonomies, a classification scheme for investigating team diversity has emerged:

(a) D*emographic/ Surface level diversity* – bio-demographic attributes such as age, gender, and race/ethnicity that are less germane to the team's task

(b) *Functional diversity* - job-related attributes such as functional expertise, education, and organizational tenure, which are more relevant to the team's task

(c) *Deep Level diversity* - psychological attributes such as personality, attitudes and individual values which are not readily observable and emerge through extended communication and interactions and members cultural backgrounds.

These three categories accurately capture individual characteristics that make up teams in diverse workplaces because they reflect the major themes in various frameworks from existing literature.

Research on diversity in GVT literature is generally lacking considerable attention and empirical validation. However, a few GVT studies have examined cultural differences among team members (Powell et al. 2004). GVT offer significant opportunity to overcome surface level or demographic diversity as most of the communication and interaction takes place through electronic medium. But because of their dispersed nature,

organizationally and geographically, and inherent membership diversity, both cultural and functional diversity have significant impact on team performance.

GVT's, which spans into different cultures, inherits group members from those cultures with different values and ethics, leading to a demographically and culturally diverse group. Many researchers have examined the impact of these culturally diverse groups on the organization and have argued for the potential impacts to derive from it.

3.3.1 Relation between GVT Diversity and Collaborative Partnership

Research in traditional collocated teams has shown that group diversity can lead to a collage of perspectives, which can help identify trend and generate ideas (Bolman and Deal 1992). Diversity impacts team performance and outcomes in multiple of ways and offers certain benefits by increasing the pool of resources (Ely and Thomas 2001). On the whole, the team diversity literature suggests that increased team diversity leads to 1) increase in innovation and creative thinking and/or 2) an increase in group cohesion and decrease in intra-group conflict.

As a source of broad and diverse cognitive resources, team diversity has been thought to enhance creativity and innovation (Bantel and Jackson 1989). It has been empirically established that, with a broad array of information and experience, diverse teams can generate wider range of options that synergistically combine the members' orientations while avoiding 'groupthink' and behavioral inertia (Hambrick et al. 1996). Diverse teams depend upon the collaborative contribution of each team member so that

multiple perspectives and knowledge bases can be applied to increase team effectiveness (Lovelace et al. 2001).

It is appropriate to adopt the social exchange theory to explore the behavior in diverse GVTs for the following reasons: (a) in GVT, social behavior is a series of exchanges, (b) team members attempt to maximize their rewards and minimize their costs, (c) when team members receive rewards from others, they feel obligated to reciprocate, and (d) in the process team members develop loyalties to each other, and project and benefit from the complementary talents of each other.

In this research it is argued that, based on the social exchange theory perspective, member diversity in GVTs will trigger a variety of interpersonal processes that can interfere with team effectiveness. For example, during the initial phase of problem solving, members with diverse perspectives may generate a more comprehensive view of the problem thus leading to a more balanced creation of goals for the GVT. The presence of diverse perspectives may also improve the GVT's ability to consider alternative explanations, interpretations, and generate creative solutions and lead to a closer understanding of benefits associated with working in teams.

Scholars have proposed that a team setting improves knowledge sharing through extensive interactions and flexibility of collaborative work (Miles et al. 1998). Wu, Sheng et al. (2006) pointed out that knowledge sharing can only be experienced where teams have organized themselves well. Functional diversity will help the team understand both internal organizational and team environment (through long-tenured members) and external environment (through short-tenured members). Diversity perspectives will shape

the understandings and encourage team members to share knowledge so that people who do not know can learn from those who do know.

Research has also established that conflict is an important process that allows teams to make better decisions because more alternatives are generated and considered prior to decisions being reached (Jehn and Mannix 2001). Pelled, Eisenhardt, and Xin (1999) concluded that conflict plays a crucial role in the relationship between diversity and team performance.

Diversity impacts team performance and outcomes in multiple of ways and offers certain benefits by increasing the pool of resources (Ely and Thomas 2001). On the whole, the group diversity literature suggests that increased group diversity leads to 1) increase in innovation and creative thinking and/or 2) an increase in group cohesion and subsequent decrease in intra-group conflict.

Based on the above understanding, in this research, it is proposed that harnessing the benefits of a diverse team would require the development of collaborative partnership among team members. Diverse team members that have a high level of mutual trust, shared goals, mutual benefits, shared knowledge and low levels of conflict will be more effective. Thus based on the above it is hypothesized that

H1. There is a positive relationship between member diversity and development of collaborative partnership in GVT.

3.3.2 Surface Level Diversity

Surface-level diversity has been defined as differences among team members in overt demographic characteristics including age, gender, and race/ethnicity (Harrison et al. 2002). Members in a team make reasonable estimates of demographics of others in the team and assign themselves and others in some sort of social classification involving ascribed patterns of thought, attitudes, and behaviors. Research in organizational science has produced a broad range of deductive theories to support arguments about the consequences of demographic diversity (Jackson et al. 1991). These theories posit that group members define and differentiate themselves from others on the basis of observable differences in age, race, gender, and like based on the similarity-attraction paradigm (O'Reilly et al. 1989).

Recently, research has focused on the potentially positive consequences of age diversity. In the case of top management teams, a number of researchers reported that younger managers were more inclined to pursue aggressive strategies, whereas senior managers sought more information to evaluate the situation and required more time to take action (Hambrick et al. 1996).

Although gender research has been conducted for decades, there is a paucity of studies examining the specific effects of gender on team performance (Rogelberg and Rummery 1996). One positive finding of gender diversity on team performance is that balanced cross-gender teams may be more advantageous than all-male or all female teams (Orlitzky and Benjamin 2003). In the GVT literature, Bhappu, Griffith, and Northcraft (1997) examined the effects of communication dynamics and media in diverse

teams, and found that individuals in face-to-face teams paid more attention to in-group/out-group differences in terms of gender than those in virtual teams.

The effects of race and ethnicity composition on team outcomes are also inconsistent as with the overall diversity research. Sessa (1993) found that temporary teams in a hospital setting that varied in racial composition exhibited more conflict than racially homogeneous ones, thereby hampering team processes. In a laboratory setting, Hinds, Carley, Krackhardt, and Wholey (2000) found that undergraduate students had the least proclivity for working in teams whose members were racially dissimilar to themselves. Other studies, however, report positive effects of ethnicity on team outcomes. In a longitudinal study, Watson, Kumar, and Michaelsen (1993) found that variation with respect to race and ethnicity influenced both member-reported team process and performance on a team project among teams of college students.

Since, most viewpoints in this research study stand on the positive side and rest on the cognitive resource diversity theory, thus it is hypothesized that:

H1a. Surface level member diversity will have a positive relationship with development of collaborative partnership in GVT.

3.3.3 Functional Level Diversity

Functional diversity has been defined as differences among team members based on job-related attributes such as functional expertise, education, and organizational tenure, which are more relevant to the team's task (Bunderson and Sutcliffe 2002). This approach to conceptualizing diversity rests on the assumption that each member in a

global virtual team brings a specific functional perspective to the team, a perspective which is gained through experience, which is typically weighted towards members' functional expertise, educational background, and organizational tenure. Further, different functional backgrounds and perspectives imply non-overlapping knowledge and expertise, which suggests that global team members have a broader pool of resources from which to draw in making decisions and taking action.

Functional expertise refers to an employee's work specialization and depth of relevant knowledge in an organization such as finance, marketing, and logistics (Bunderson 2003). Employing functional expertise as an indicator of cognitive diversity in teams is deemed efficient because organizations frequently structure functional groupings to carry out their business operations. Consequently, functional diversity provides teams with direct access to a variety of expertise, information bases, and resources that are not readily available if all members were from the same functional area. The expertise of team members has been found to be positively related to team effectiveness and efficiency. For example, Bantel (1994) reported a positive relationship between team members' functional expertise and performance. Keller (2001) also observed that functional expertise has a positive, indirect effect on both schedule and budget performances of research and development teams.

A person's educational background can be a significant indicator of his/her knowledge, skills, and capability. As in functional expertise, dissimilarity in educational background seems to have a positive impact on team performance because it fosters a broader range of cognitive skills (Cohen and Bailey 1997). Jehn, Northcraft, and Griffith

(1999) observed that informational diversity, such as education and functional areas, were positively related to actual work group performances, although the relationship was mediated by task conflict. Carpenter and Fredrickson (2001) similarly reported that international experience and diverse educational background were positively related to firms' global, strategic postures among top management teams.

The effect of tenure heterogeneity on team performance has been largely inconclusive with varying empirical results. Tenure homogeneity is generally associated with team members' familiarity of policies, procedures, and political/situational factors in organizations and thus potentially offers the advantage of less communication interruptions, power struggles, and conflict. Several researchers argue that work teams with homogeneous organizational tenure tend to have a high level of team cohesion and social integration (Michel and Hambrick 1992; O'Reilly et al. 1989). Pelled et al. (2001), for example, reported that tenure diversity was negatively related to both task and emotional conflict in work teams. Heterogeneous organizational tenure also suggests that team members differ in their organizational experiences and bring varied perspectives to issues, which works favorably for developing more informed strategic alternatives.

In global virtual team literature, studies with regards to functional diversity are generally absent. More focus has been given to studies with cultural diversity (Martins et al. 2004). As global virtual teams are formed and comprised of individuals from different functional backgrounds and will bring a pool of resources to the table, functional diversity will have an indirect effect on effectiveness through the interplay of partnership

development among the team members. Based on the above discussion, it is hypothesized that

H1b. Functional member diversity will have a positive relationship with development of collaborative partnership in GVT.

3.3.4 Deep Level Diversity

Deep Level diversity has been defined to include differences among team members' psychological characteristics including personality, values, and attitudes (Harrison et al. 2002; Jackson et al. 1995b). Clues to these latent individual differences are taken from members' interactions with one another as they unfold over time. These clues are expressed in behavior patterns, verbal and non verbal communications, and exchanges of personal information (Harrison et al. 1998).

Although the majority of team diversity research has focused on demographic characteristics (Tsui et al. 1992; Milliken and Martins 1996; Williams and O'Reilly 1998), researchers are beginning to assess intra-group differences in ability, personality, attitudes, and values (Jehn et al. 1999; Harrison et al. 2002). In comparison to observable diversity, these characteristics are considered deep-level, unobservable (Harrison et al. 1998), underlying (Milliken and Martins 1996), and psychological (Jackson et al. 1995b).

People of different ethnic backgrounds possess different attitudes, values, and norms. The increase in cultural mix of employees in today's competitive organizations focuses attention of scholars on the distinctions between various ethnic group's attitudes and performance at work. For example, Rubaii-Barrett and Beck (1993) examine the

similarities and differences in work climate perception and levels of job satisfaction among Anglo-American and Mexican-American local government employees.

More often than not, differences in cultural norms and values among ethnic teams reveal themselves in different work-related behaviors (Cox and Blake 1991). One area of cultural differences researched extensively is the contrast between individualism and collectivism (Hofstede 1980). Compared to individualist cultures, collectivist cultures emphasize the needs of the team, social norms, shared beliefs and cooperation with team members. Research indicates that individualism-collectivism is an important dimension of cultural difference in nations (Triandis et al. 1990). In general, Asians, Hispanics, and blacks have roots in nations with collectivist traditions (Hofstede 1980), while Anglos have roots in the European tradition of individualism (Hofstede 1980). The extent of people's cultural beliefs of individualism or collectivism has been used to predict the effectiveness of many management practices. Earley (1993), for example, examines 165 managers from China, Israel, and the United States to determine the effects of individualistic/collectivistic cultural beliefs upon performance.

Members of global virtual teams, which are formed with participants from different countries are likely to have diverse cultural backgrounds and hence, dissimilarity in their attitudes, values and beliefs towards decision making and team collaboration. These diverse global virtual teams are likely to encounter difficulty in identifying priority of issues and hence integrating diverse views of the members.

Heterogeneous teams setup based on personality profiles have experienced process problems (Anderson 1971). Culture also seems to have a significant impact on

team processes. Members of a culturally heterogeneous global virtual team are likely to be influenced by their cultural backgrounds when working together. In this regard, Carte and Chidambaram (2004) argued that modes of communication vary across people from different cultures. Cultural diversity in teams also results in diversity in cognition, values, and demeanor (Hambrick et al. 1998).

Early and Mosakowski (2000), measuring diversity in terms of culture, concluded that highly homogenous teams and highly diverse teams outperformed moderately diverse teams. The authors highlighted that in moderately diverse teams, some people were alike as opposed to highly heterogeneous teams where few individual characteristics were shared by the team members. The effect on effectiveness was ascribed to this sub-group critical mass. In highly diverse teams, this sub-group critical mass was absent and an integrated full-group culture emerged, referred to as shared group identity. It is argued that in highly diverse teams members constructed a social impression of the team as a whole rather than engaging in individual categorization behavior.

Based on the above discussion it is posited in this study that in global virtual teams, where members span from different cultures forming of sub-group critical mass will be difficult to achieve, teams would be highly heterogeneous, and a team identity will emerge based on shared understandings of the members of the team. Thus it is hypothesized that:

H1c. Deep-level diversity of global virtual team members will have a positive relationship with development of collaborative partnership.

3.4 Moderators

3.4.1 Collaborative Technology

Global virtual teams are possible only because of recent advances in computer and telecommunications technology. Because these technologies define the operational environment of the global virtual team, it becomes imperative to examine how the functionalities of these technologies impact the infrastructure of GVT work.

Early research on alternative forms of communication assumed that different media inherently possess characteristics that make them more or less effective for certain tasks. This perspective was based on media richness theory (e.g., Daft et al. 1987). Recent research extends media richness theory by considering the effects of the social context in which communication is embedded and argues that team norms and organizational culture influence the appropriate use of specific technologies (Markus 1994). Extending this idea even further, research on communications technologies have taken a "contextual" perspective. This approach acknowledges the reciprocal relationship between aspects of technology and social context - each influences the development of the other (Orlikowski 1992; Maznevski and Chudoba 2000). GVTs use ICT's to accomplish a majority of team related activities; thus functionalities of technology would impact team's outcomes and effectiveness. Anecdotal evidence suggests that when teams use a variety of communication technologies effectively, overall effectiveness of the team increases (Maznevski and Chuboda 2000).

Information technology has limits and is not able to transfer the same rich, social, emotional, and non-verbal information present in traditional face-to-face settings (Townsend et al. 1998). The severity of this information loss is determined by the richness of the ICT predominantly used by the GVT. For example team members may experience much greater information loss by simply using email as opposed to using a video conferencing technology. Previous literature has suggests that communication in virtual team environment is significantly less effective than in traditional team settings (Hightower and Sayeed 1996).

Given the lack of face-to-face interaction, GVTs must compensate by establishing a virtual collaboration environment that is suitable for the particular context of the project. Much research has gone into how teams can utilize information and communication technologies to communicate and coordinate. Caouette and O'Connor (1998) found that collaborative technologies can neutralize the negative impact of group demography and improve cohesion by ensuring that surface-level diversity, the key catalyst in the appearance of subgroups, is not easily perceptible.

Collaborative technologies often reduce the seeking and disclosing of individuating information. The more limited the information, the more people over-attribute the minimal cues, and the more they tend to idealize other people and assume similarity (Lea and Spears 1992). Walther (1992) found that the repeated electronic interactions (i.e., the accumulation of messages and opinions) among the members gradually reveal team feelings and attitudes leading to an increased sense of belonging.

Recently Sarker, Valacich, and Sarker (2005) developed a model of technology adoption by groups based on valence perspective. Based on their model, they proposed that the technological characteristic, which is particularly relevant when a team is faced with a technology adoption decision, refers to the extent to which a technology is perceived to support team processes, including task performance. They termed this as group supportability characteristic of a technology. They further stated that group supportability may be assessed based on the capability of the technology to enable parallelism, transparency, and sociality within the group context. In this research study, to asses the perceptions regarding IT support for collaboration, this construct of group supportability is adapted.

Parallelism is defined as the degree to which the technology is capable of enabling global virtual team members to perform tasks in parallel, within a shared framework. Transparency is defined as the degree to which the technology is capable of making individual group members' work visible and modifiable by other group members. Sociality is defined as the degree to which the technology is capable of enabling members to build social relationships and knowledge networks.

Technology is depicted as an enabler, allowing individuals to capture, share, transfer, and leverage their knowledge within and across organizations. With the advent of advanced computer technology (e.g., intranet, extranet and Internet), organizations are able to work within collaborative spaces for communication, discussion groups, decision-making capabilities, and knowledge leveraging. Collaborative tools and technologies that focus around collaborative capability are enabling people to advance their strategic

initiatives by creating synergistic environments that permit group cohesion and dependable social dynamics. Thus it is hypothesized that:

H2. Collaborative technology will moderate the relationship between diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with highly collaborative technologies than teams with low levels of collaborative technologies.

3.4.2 Task Features

The role of task design and its impacts on team performance have been researched in existing literature to a great extent (Stewart and Barrick, 2000). Prior research on groups and teams (Goodman 1986; McGrath 1997) suggest that task differences moderate the relationships between team inputs, processes, and outputs. The team structures depend upon the task they perform (Grimes and Klein 1973). Task itself is not a unitary phenomenon and there are several measures of task characteristics.

Task has been characterized based on the information processing approach (Gladstein 1984). The dimensions identified are task uncertainty and task interdependence. Van de Ven and Delbecq (1974) recognized the strong correlation between complexity and variety and collapsed them into a single variable noting that "taken together, task complexity and variability constitute the major dimensions of task uncertainty".

Task complexity is defined as degree to which a task involves mental processes such as problem solving, applying discretion, and using technical knowledge (Van de Ven and Delbecq 1974). Complexity from task could stem from lack of appropriate

inputs or information required to accomplish the task. Difficulty could also arise due to lack of appropriate skills to perform the task. Task complexity affects the nature of team processes because it shapes the links among the different roles in the team, and the coordination requirements from the team members (Kozlowski et al. 1999). From a theoretical perspective, task complexity diminshes the informational barriers between members. Members in the team require information from other members in the team and members must now expand their scope and horizon and significantly process more information than what is required in a routine and simple task.

Task variety, another dimension of task uncertainty, is defined as the degree to which a task involves performing a number of different sub tasks and frequently encountering exceptional circumstances requiring flexibility (Van de Ven and Delbecq 1974). Another opposite dimension of routine and monotonous task, task variety ensures that members of the team must engage in collaboration with other members to seek information and knowledge to perform new assignments.

Interdependence can be defined in a general sense that team members must depend on each other at work (Wageman 1995). There are various forms of interdependence defined in the organizational behavior literature (Campion et al. 1993). One form is task interdependence where group members interact and depend on one another to accomplish the task (Shea and Guzzo 1987). It may also increase team effectiveness because it enhances the sense of responsibility for others' work or because it enhances the reward value of team accomplishments.

Another form of interdependence is goal interdependence. Goal setting is a well documented individual level performance improvement technique, and a clearly defined mission or purpose is thought to be critical to group effectiveness (Hackman 1983). Not only should goals exist for groups, but individual members' goals must be linked to the groups' goals to be maximally effective. This study's focus will be more on task interdependence in contrast to goal interdependence because goal interdependence is captured in the creation of shared goals for team members. Task interdependence is defined as the degree to which completing tasks requires the interaction of team members (Stewart & Barrick, 2000).

Several researchers have argued that the level of task interdependence has a substantial effect on team processes and outcomes. In particular, it is suggested that task interdependence moderates the relationship between team diversity and team performance by influencing team member interaction and coordination (Shea and Guzzo 1987; Saavedra et al. 1993; Timmerman 2000). Potential positive effects of high task interdependence in traditional teams have been researched to include cohesion, trust, and sense of indispensability of personal contributions to the team (Hertel et. al. 2004, Kirkman et al. 2004).

When tasks are highly interdependent, team members must interact with each other to perform the team task, and the individual contributions cannot be separated out (Saavedra et al. 1993). Under this type of high interdependence, team members commonly have different roles, skills, and resources, and they perform their parts of the task in a flexible order. Team performance requires mutual interactions and coordination

among team members, and the final output cannot be obtained unless all team members interactively collaborate on task completion (Wageman 1995).

Several researchers have found that when task interdependence and uncertainty are high, team members depend on each other for expertise, information, and resources to complete a task (Campion et al. 1993). In a low interdependence and uncertain task, however, team members tend to operate as individuals with less intense interaction and coordination, thereby reducing negative affective outcomes and potential for conflict arising from member heterogeneity (Stewart and Barrick 2000).

Reflecting on the findings in the literature, the following is proposed:

H3. Task features – interdependence, complexity, and variety will moderate the relationship between GVT diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with high levels of task interdependence, complexity and variety, than teams with low level of task features.

3.5 Collaborative Partnership

Maznevski (1994) remarked that the common element in high performing teams with high member diversity, is integration of that diversity. She further stated that member diversity led to higher performance only when members were able to understand one another, combine, and build on their ideas. Interaction processes are critical for integrating diverse viewpoints in diverse teams (Hurst et al. 1989). To explain why diversity might influence outcomes such as turnover rates and performance, most scholars posit a mediator between diversity and team processes such as communication, use of information, cooperation, cohesion, and conflict (Jackson et al. 2003).

According to the American Heritage Dictionary, a partnership is defined as "a relationship between individuals or groups that is characterized by mutual cooperation and responsibility, as for the achievement of a specified goal."

Collaborative partnership is determined by various elements which are derived from Social Exchange Theory. The basis of these elements is that partners help each other to see and do what they would have never been able to see or do on their own. The following section would review elements of a collaborative partnership which are drawn from the works of Anderson and Narus (1990) and Handerson (1990).

Mutual benefits

Mutual benefits can be defined as the benefits from the relationship being derived by each member in the group. In general the benefits derived from the relationship to the participating team members influences the nature of the inter-group relationships since the value placed on the relationship is directly related to the levels of benefits derived from it. Mutual benefit is the degree of articulation and agreement on benefit and risk between partners (Lee and Kim 1999).

In GVT context, the value derived from the relationship to individual members includes member satisfaction and team effectiveness. In some cases, benefits in terms of rewards and incentives are also associated with the team effectiveness.

Shared Goals

Sarker, Valacich, and Sarker (2005) defined shared goals as the degree to which team members agree on the project aims with other team members. Research relating to goal setting finds a positive relationship between the existence of clear, challenging goals

and increased individual and group productivity (Pritchard et al. 1988). Formation of shared goals is a pre-requisite for future-oriented cooperative action, especially in conditions of high task interdependence (Sarker and Sahay 2003). Maznevski (1994) found that multinational teams who engage in certain communication processes designed to increase shared understanding are more effective.

GVT involve people from different disciplines, business units, organizations, and cultures. Members in these diverse teams will have different ways of perceiving their tasks, key issues, and of making sense of their situation. These differences are often referred to as psychological 'frames' because they represent lenses for understanding, filtering, and sorting information. Differences in these frames need to be managed and dealt with by the virtual team in order to successfully achieve its objectives.

Shared vision is a critical element that binds together highly effective teams. Unfortunately, in hurried situations, insufficient time is spent on ensuring that all team members are driving in the same direction. Teams can feel pressure to be moving in some direction, with the belief that their work will ultimately be useful towards the end goal. As projects increase in their complexity and number of parties involved, the common understanding of the ultimate objective is of increasing importance.

Mutual Trust

There is a widely recognized view that trust, as the positive and confident expectation in the behavior of another party (Cook and Wall 1980), is a vital requirement and a 'need to have' quality for effective virtual teams (Jarvenpaa and Leidner 1999).

Trust in a team context has been defined as degree of confidence and willingness between team members (Jarvenpaa et al. 1998)

For global virtual teams, being both diverse cultural entities and geographically dispersed virtual entities, the risk of potential misunderstanding and mistrust is heightened (Zakaria et al. 2004). In order for a global virtual team to be effective, intra-group trust must exist (Jarvenpaa and Leidner 1999). Jarvenpaa, Knoll, and Leidner (1998) argue that global virtual teams develop a "swift" form of trust but go on to say that such trust is very fragile and temporal. They do acknowledge, however, that trust amongst group members may be improved through social communication that complements rather than substitutes task communication. Jarvenpaa, Knoll, and Leidner (1998), Jarvenpaa and Leidner (1999), and Galegher and Kraut (1994) all found that trust and team performance were positively correlated to effective communication among virtual team members.

Shared Knowledge

Shared knowledge is defined as the understanding or appreciation among partners for the issues that affect performance (Handerson 1990).

The purpose of forming virtual teams is developing collective knowledge which is not held by any single individual member. However, this collective knowledge is not present initially when the team is assembled but is consequently developed during the course of the task accomplishment by the team members. The intellectual power of virtual team is in their diffuse expertise and the ability to blend different experiences to create collective/shared knowledge. As individuals work within a global virtual team,

they must be able to utilize others' knowledge as well as develop their own (Bhappu et al. 2001, Griffith et al. 2003). The more effective the knowledge sharing in global virtual team, the better it is able to perform its tasks (Malhotra et al. 2001).

Mutual understanding and shared knowledge among team members enhances comprehension and interpretation of the information that is communicated among them (Krauss and Fussell 1990). This understanding occurs because it enables the team members to formulate their contributions with an awareness of what other team members do and do not know (Krauss and Fussell 1990). Shared knowledge in team settings is developed through joint training and development and through firsthand experiences and joint problem-solving among team members (Krauss and Fussell 1990). When shared knowledge is incomplete, individuals' ability to interrelate to the team as a whole is lower (Van den Bosch et al. 1999). When group members are unable to interrelate to each other's expertise, knowledge integration is unlikely to occur effectively or efficiently.

Conflict

Researchers have long stated that conflict is an important process that allows teams to make better decisions because more alternatives are generated and considered prior to the decision being reached (Jehn and Mannix 2001). It is generally defined as a process in which members perceive that their opinions and interests are being opposed or are being negatively affected by another member (Wall and Callister 1995).

Jehn and Mannix (2001) proposed three types of conflicts – relationship, task, and process conflict. As per them, r*elationship conflict* involves personal issues such as dislike among group members and feelings such as annoyance, frustration, and irritation.

Task conflict is an awareness of differences in viewpoints and opinions pertaining to a group task. *Process conflict* is defined as an awareness of controversies about aspects of how task accomplishment will proceed. More specifically, process conflict pertains to issues of duty and resource delegation, such as who should do what and how much responsibility different people should get.

Many theorists have argued that teams can benefit from conflict because it contributes to a critical review of options and increases accountability of group members (Carte and Chidambaram, 2004). Moderate levels of task conflict have been shown to be beneficial to group performance on certain types of tasks (Jehn 1995; Jehn et al. 1999). When given a complex cognitive task, teams benefit from differences of opinion about the work being done and about ideas (Jehn 1997). Task conflict improves decision quality because the synthesis that emerges from the conflict is generally superior to the individual perspectives themselves (Schwenk 1990).

Research has shown that when team members have high levels of mutual trust, common goals, unified rewards, and shared knowledge, they tend to agree on norms regarding work, and this agreement in turns promote harmony (Nemeth and Staw 1989) and decreases interpersonal tensions. Thus high value of consensus among partnership elements seem to be beneficial to work teams, in that it is likely to increase team performance.

As explored in chapter 2, member diversity and heterogeneity influences team processes and effectiveness, but it is unclear whether is promotes or constraints team effectiveness. On the one hand compared to homogenous teams, members of a

heterogeneous team are inclined to show more cooperation (Cox and Blake 1991), members are more innovative (O'Reilly et al. 1989), and derive higher quality solutions (Kirchmeyer and Cohen 1992). On the other hand, Williams and O'Reilly (1998) concluded that increased member diversity in teams has negative effects on member behavior and team effectiveness (Watson et al. 1993).

One reason, highlighted in the literature, for these opposite results may be that researchers have often neglected to specify the psychological mechanisms underlying the relationship between diversity and team outcomes (Chatman and Flynn 2001), relying instead on demographic characteristics as proxies for such mechanisms (Lawrence 1997). Recent research has acknowledged the complexity of diversity effects and identified factors that influence whether diversity enhances or constraints performance and outcomes (Jhen et al. 1999).

The central tenet in the arguments presented above is that positive benefits of member diversity in a GVT can be harnessed using development of collaborative relationships among the members of the team. As team members interact with each other and accomplish various tasks, over time norms within the team for team functioning, strengthen and their enforcement intensifies. Initially, group norms might not be established due to lack of knowledge of members or specific absence of norms within the team, and member diversity might have significant impact on relationships. But as relationships mature, GVT tends to become more effective and member heterogeneity is vital in bringing in a pool of resources to accomplish the task at hand.

Thus based on the above discussion, it can be hypothesized that:

H4. Collaborative Partnership will mediate the relationship between member diversity and global virtual team effectiveness.

H4a. Collaborative Partnership will mediate the relationship between member diversity and global virtual team performances.

H4b. Collaborative Partnership will mediate the relationship between member diversity and global virtual team member satisfaction.

3.6 Summary of Hypotheses

H1. There is a positive relationship between member diversity and development of collaborative partnership in GVT.

H1a. Surface level member diversity will have a positive relationship with development of collaborative partnership in GVT.

H1b. Functional member diversity will have a positive relationship with development of collaborative partnership in GVT.

H1c. Deep-level diversity of global virtual team members will have a positive relationship with development of collaborative partnership.

H2. Collaborative technology will moderate the relationship between diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with highly collaborative technologies than teams with low level of collaborative technologies.

H3. Task features – interdependence, complexity, and variety will moderate the relationship between GVT diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with high levels of task interdependence, complexity and variety, than teams with low level of task features.

H4. Collaborative Partnership will mediate the relationship between member diversity and global virtual team effectiveness.

H4a. Collaborative Partnership will mediate the relationship between member diversity and global virtual team performances.

H4b. Collaborative Partnership will mediate the relationship between member diversity and global virtual team member satisfaction.

CHAPTER IV

RESEARCH DESIGN

4.1 Introduction

The purpose of this chapter is to explain the research approach and methodology adopted in this study. It describes the methods used to gather and prepare information for use in testing the research hypotheses described in the previous chapter. Sections and sub-sections of this chapter include discussion of the empirical methodology, sampling strategy, measurement of variables, data collection procedures, pre-pilot, pilot testing of the instrument, and ethical considerations for the study.

The research methodology comprises of four distinct stages: development of the instrument, pre-pilot testing, the pilot study, and the main study. In this chapter, phase one, two and three are described and the procedure for conducting the main study is outlined. Chapter 5 discusses the main study and its results at length.

4.2 Selection of Research Methodology

An appropriate methodology for this type of study would be the field survey methodology, which is defined as the study of single or multiple and related processes/ phenomena in single or multiple organizations (Palvia et al. 2004). The research methodology selected for this study is driven by the perspective that it is necessary to get real world knowledge about global virtual teams as virtual teams would be difficult to construct or replicate in laboratory settings.

Literature on field survey methodology suggests that there are two main reasons for choosing a survey research strategy: one is to 'present information without trying to test a model' and the other is to 'find a causal relationship among variables'. The latter counts more towards enhanced research contributions than the former since the results of model-testing increases our understanding of the relevance of the chosen variables and their relationships.

Survey research is a major presence in Information Systems (IS). In a recent review of the use of different methodologies, Palvia, Leary, Mao, Midha, Pinjani, and Salam (2004) examined the articles published at seven "leading" IS journals during the years 1993-2003, and found that about 22% articles employed survey methods to gather data. Compared with other methodologies with controlled settings, such as laboratory and field experiments, survey research involves examining a phenomenon in a wide variety of natural settings [Pinsonneault and Kraemer, 1993]. Therefore, this method has the potential to produce generalizable results that can be applied to a larger population.

Newstead, Huff, and Munro (1998) enlist the benefits associated with survey research. They highlight that surveys are easy to administer and are simple to score and code, allow researchers to determine the values and relations of variables and constructs, and provide responses that can be generalized to other members of the population studied and often to other similar populations. Further, they also state that surveys can be reused easily and provide an objective way of comparing responses over different groups, times and places.

Mason (1992) also points out a number of benefits and problems related to the use of survey research. The main benefit of survey research is that with a large sample size and well-formulated hypotheses, survey results can provide valid and reliable quantified information on different aspects of the subject. Besides, the ability of replicating survey research in various settings offers researchers a mechanism for achieving high external validity.

Nevertheless, Pinsonneault and Kraemer (1993) maintain that without any secondary data or enough numbers of samples, the quality of such research might be jeopardized. Furthermore, high quality survey research relies on the development of compelling hypotheses and on the wording of the questionnaire itself. If these two stages of research design are not thoroughly thought out and carefully constructed, then results are bound to be biased. They also criticize the inability of the survey method to disclose the context in which information technology is implemented and used.

In the area of global virtual teams, there is a general scarcity of field survey research. As pointed out by Maznevski and Chudoba (2000), a number of GVT studies

are conducted in highly controlled settings in a single instance or over short period of times, leaving many critical questions unanswered.

4.3 Sampling Strategy

A common goal of survey research is to collect data that represents the population. The researcher is always looking for ways to generalize research findings based on the sample drawn from the population. Thus it becomes imperative that the researcher must take care in the selection of a sample, to minimize the chance that the estimates obtained from a sample may differ from those that would be obtained if all units in the population had been included.

A *sampling frame* is the working population from which the sample may be drawn. As this research studies global virtual team diversity, collaborative partnership, and associated antecedents and consequences, the sampling frame needed to meet at least the definitional requirement.

For the purpose of this study, GVTs are defined as groups that are identified by their organization(s) and members as a team, are responsible for making and/or implementing decisions important to the organization's global strategy, use technology-supported communication substantially more than face-to-face communication, and work and live in different countries. Based on the above definition, the appropriate sample should consist of GVT in organizations which satisfy the definitional criteria. For a global virtual team to be called global its members have to be located in more than one country. Thus the unit of analysis is a global virtual team.

4.3.1 Sample Size

An analysis of the literature was conducted to identify the appropriate sample size used for research where the unit of analysis was teams. Table 4. lists a few of prominent studies with their sample sizes.

Table 4. Sample Sizes Used in Literature

Reference	Sample Size (Teams)
Majchrzak et al. (2005)	54
Van Der Vegt and Bunderson (2005)	57
Kirkman et al. (2004)	35
Hertel et al. (2004)	31
Bunderson and Sutcliffe (2002)	44
Mortenson and Hinds (2001)	24
Stewart and Barrick (2000)	45
Pelled et al. (1999)	45
Janz et al. (1997)	27
Henderson and Lee (1992)	41
Ancona and Caldwell (1992)	45

As pointed out before, there are not many studies employing field survey methodology, primarily due to inherent difficulties associated with access to respondents and lack of resources. Based on the above analysis a sample size of 60 global virtual teams was targeted.

4.4 Data Collection Procedure

To gain access to organizations, personal contacts were utilized. The contact person was asked to direct the researcher to senior executives or teams in the organizations. The approval of the organization to participate in the study was taken from a senior executive and a list of teams, team members, and external manager was requested. External managers are individuals who are not a part of the team but are affected by teams output in some manner and could evaluate the team performance

If the firm agreed to participate in the study, an executive report with the findings of the study, including results on how teams in their organizations are compared to the entire sample was offered, if requested. The survey was administered to the participants mainly through an online website.

In order to balance the data requirements from this study and calls from management to minimize time demands on their employees, an "informant sampling approach" was utilized. Based on the work of Van de Ven and Ferry (1980) "An informant sampling approach recognizes that many members of a given collective are qualified to provide assessments of those global properties that they experience together". The informant approach therefore "relies on a limited selective sample of people who are the most knowledgeable of the global properties of interest" rather than seeking to obtain measures from all members of a collective (Van der Vegt and Bunderson 2005).

Furthermore, proponents of this approach state that, since some variance across informants is to be expected, the informant approach involves sampling several informants so that, inter-rater reliability can be assessed and, if convergence is

demonstrated, a "balanced perspective" can be obtained by "averaging informants' perceptions" (Van der Vegt and Bunderson 2005). Other examples of using an informant sampling strategy to study team diversity can be found at Simons, Pelled, and Smith (1999) and Tsui, Egan, and O'Reilly (1992). In accordance with this approach, senior executives or managers of the team were asked to indicate selected members of the GVT to complete and return the team member survey. In addition, external managers in the organization were asked for their willingness to complete and submit 'stakeholder survey' measuring team effectiveness. The use of the stakeholder survey is conditional based on the total number of completed instruments collected.

4.5 Measurement

Following the informant sampling approach, all items in the instrument are framed as "informant" rather than "respondent" items. Informant items ask individuals to evaluate their team rather than their own personal behaviors or attitudes, unless otherwise stated. All items are assessed using a scale range from 1, "strongly disagree" to 7, "strongly agree", as shown in Table 5.

Table 5. Likert Scale used in Responses

Scale	Code
Strongly Disagree	1
Disagree	2
Somewhat Disagree	3
Neutral	4
Somewhat Agree	5
Agree	6
Strongly Agree	7

Following Churchill's (1979) suggestions for developing instruments with desirable psychometric properties, literature on group research as well as IS research was surveyed before the questionnaire was developed. The conceptual definitions of the constructs were examined and identified dimensions were verified. Items that captured the domain of the construct and had high reliability were selected. A total of sixty three items were included in the final instrument. The complete instrument for team member responses is included as Apendix A. Individual construct measurements are described below.

Diversity

Diversity is an umbrella term for the extent to which members of a team are dissimilar (heterogeneous) with respect to individual-level characteristics (Jackson et al. 1991). In diversity literature, diversity is classified into three different types – surface level, functional, and deep level. In this study, all three types of diversity are measured.

Surface Level Diversity

There have been disagreements about the classification of some surface level variables. Specifically, Jackson, Aiken, Vanjani, and Hasan (1995) included education as a surface-level attribute, but Milliken and Martins (1996) considered it an underlying attribute. Inspite of the differences, both studies agreed that age, race/ethnicity, and sex were readily detectable or overt features of surface level diversity (Jackson et al. 1995; Milliken and Martins 1996). Also, research on personal perception has established that age, gender, and race/ethnicity are heavily relied on for forming initial perceptions of others. These are the three types of surface-level diversity examined.

Functional Diversity

Functional diversity has been defined as differences among team members based on job-related attributes such as functional expertise, education, and organizational tenure, which are more relevant to the team's task (Bunderson and Sutcliffe 2002). Functional diversity is measured using a person's educational background, years of experience with current organization – organizational tenure, and functional area where the member has had most experience.

Researchers have stated that diversity effects rely on perceptions (Lawrence 1997). These perceptions have rarely been studied in team diversity research (Harrison et al. 2002). Thus 6 items measuring surface and functional diversity perceptions are included in the research instrument. Another compelling reason to measure perceptions has to do with the availability of data from all team members

Deep Level Diversity

As explained in previous chapters, deep level diversity has been defined to include differences among team members' psychological characteristics including personality, values, and attitudes (Harrison et al. 2002; Jackson et al. 1995b). Clues to these latent individual differences are taken from members' interactions with one another as they unfold over time. There is less guidance in the literature on selecting variables that reflect deep level diversity, which is broadly defined as including a variety of psychological characteristics (Harrison et al. 1998)

Prior research points that the impact of a particular group level diversity characteristic depends on job-relatedness of the characteristic (Pelled 1996; Pelled et al.

1999). Therefore, in the context of the current study, which is focused on partnership development in global virtual teams, one characteristic of deep level diversity which is of interest is perceptions of team members towards other members of the team. A central value associated with an individual's behavior in a team is collectivism (Chatman et al. 1998; Eby and Dobbins 1997). More collectivistic individuals tend to define themselves as part of a team, give team goals priority over personal goals, and emphasize relationships with team members even at personal cost, whereas less collectivistic individuals tend to define themselves as autonomous from teams, give their own self-interest priority over team goals, and focus only on those relationships that are beneficial to them (Singelis et al. 1995).

Deep level diversity is thus measured using a 9 items adopted from Martins, Milleken, Wiesenfeld, and Salgado (2003) and Harrison, Price, Gavin, and Florey (2002) by gathering responses on perceptions of differences in personality, values, and attitudes.

Elements of Collaborative Partnership

Twenty three items measuring the five different elements of collaborative partnership – mutual benefits, shared goals, mutual trust, conflict and shared knowledge are adapted and modified from a number of sources (Table 4.3). Based on the informant sampling approach, these items are modified to ask the informants to evaluate the global virtual team they are a member of at the time of the study. All the items are rated on a 7 point scale with 1 being strongly disagree and 7 being strongly agree. .

Both task and relational conflict are measured using items developed by Jehn and Mannix (2001) and Van der Vegt and Bunderson (2005). A total of seven items asses the

conflict present among the team members. Task conflict was measured using four items that assess team's disagreements about what work to do and how work should be done, whereas relational conflict was measured with three items that assess the level of personality disagreement.

Collaborative Technology

Six items adapted from Sarker, Valacich, and Sarker (2005) were modified to asses the team supportability of the technology employed by the global virtual team to accomplish the task. All items were modified to suit the informant sampling approach.

Task Features

Three items were adapted from Van der Vegt et al. (2001) to measure the task interdependence as perceived by GVT members. Items were modified to asses the team response based on informant sampling approach. In addition, three items measuring task complexity adapted from Van de Ven and Delbecq (1974), and Dean and Snell (1991) were included. Task Variety was measured by three items adapted from Van de Ven and Delbecq (1974), and Dean and Snell (1991) and modified to suit the informant sampling approach.

Team Effectiveness

Team effectiveness was measured using two set of variables – team performance and member satisfaction. Subjective measures of performance were used because of the substantial problems using objective measures (Ives et al. 1983). Since the sample would involve teams from multiple organizations, use of internal accounting and organizational data to measure performance would be inconsistent.

Team performance was assessed based on team meeting its objectives within time and budget. Six items from Hackman (1990) were adapted in accordance with informant sampling approach. Four items measured member's satisfaction from being a part of the global virtual team and their willingness to again become a part in the future. These were adapted from Lurey & Rainsinghani (2001) study. Responses on all the ten items were collected on a seven point Likert scale.

Manager Judgments of Effectiveness

Virtual team and traditional team literature suggests using external managers to assess the teams performance (Hackman 1990, Furst et al. 1999). A separate instrument was designed to measure external manager's assessment of the team in question. The teams will be assessed based on their efficiency, effectiveness, and elapsed time. External managers are individuals who were not formal members of the global virtual team but are directly affected by the output of the team (Handerson and Lee 1992). A 5-point response format was used ranging from 5 = "Extremely high" to 1 = "Extremely low" performance. The nine items were adapted from Handerson and Lee (1992). Complete instrument for stakeholder responses is included as Appendix B.

Keeping in perspective the data collection limitations and availability of external managers to evaluate the team performance, the use of data collected from this instrument is conditional. Thus responses from both members and external managers are being sought.

Table 6. lists the definitions, corresponding question numbers in the final instrument, and original reference in the literature from where the items were adapted.

Table 6. Instrument Development

Construct	Definition	Literature Reference	Item #
Diversity	Degree to which members of a team are dissimilar		
Surface Level Diversity	Degree to which team members differ on demographic differences.	Harrison et al. (2002); Jackson et al. (1995); Milliken and Martins (1996)	1-3
Functional Diversity	Degree to which team members differ in their functional backgrounds	Bantel (1994); Kirkman et al. (2004 b)	4-6
Deep Level Diversity	Degree to which team members differ based on individual characteristics, such as idiosyncratic attitudes, values, and preferences.	Martins et al. (2003); Harrison et al. (2002)	7-15
Collaborative Partnership	Patterns of cooperative interaction between independent actors		
Mutual Benefits	Degree to which benefits from the relationship are being derived by each member in the team	Lee and Kim (1999); Van de Ven and Ferry (1980)	16-18
Shared Goals	Degree to which team members agree on the project aims with other team members	Huang et al. (2002)	19-24
Mutual Trust	Degree of confidence and willingness between partners	Jarvenpaa and Leidner (1999)	25-28
Shared Knowledge	Degree of understanding or appreciation among team members	Bock and Kim (2002); Bock et al. (2005)	29-31

	for the issues that affect performance		
Conflict	Degree to which members perceive that their opinions and interests are being opposed or are being negatively affected by another member	Jehn and Mannix (2001); Van der Vegt and Bunderson, (2005)	32-38
Task Interdependence	Degree to which team members interact and depend on one another to accomplish the task	Van der Vegt et al. (2001)	39-41
Task Complexity	Degree to which a task involves mental processes such as problem solving, applying discretion, and using technical knowledge	Van de Ven and Delbecq (1974); Dean and Snell (1991)	42-44
Task Variety	Degree to which task involves performing a number of different sub tasks and frequently encountering exceptional circumstances requiring flexibility.	Van de Ven and Delbecq (1974); Dean and Snell (1991)	45-47
Collaborative technology	Degree to which a technology is perceived to support team processes	Sarker et al. (2005)	48-53
GVT Effectiveness	Team-produced output (performance) and the consequences a team has for its members (Satisfaction)	Lurey and Raisinghani (2001); Ancona and Caldwell (1992)	54-63
GVT Effectiveness (External Managers)		Handerson and Lee (1992)	1-9

4.6 Pre–Test of the Instrument

The instrument created from assembling and modifying the items from existing IS literature was pre-tested. The pre-test was conducted mainly with the objective of refining the instrument items in terms of wording and conveying the overall meaning. Four graduate students, four faculty members and 2 industry executives tested the instrument.

Based on the recommendations received from these eight individuals the instrument was refined for wordings and a major change was the consistent use of 7-point Likert scale instead of 5 – point scale to assess the responses. All the recommendations were duly acknowledged and necessary changes were made to the instrument.

Administration of the Instrument

Since the data collection involved soliciting responses from team members of a global virtual team, which are often located at off shore locations, it was imperative to create and administer an online instrument. An online version of the instrument was created and posted on the website, www.zipsurvey.com. Zip survey was selected due to following reasons: point and click user interface, ease of administering the survey and tracking responses in real time, advantages of downloading the responses in excel format, and the option of creating a monthly subscription account. Further, ZipSurvey offered data privacy, encryption and account management services.

4.7 Pilot Study

The use of a pilot study is recognized as a critical part of a rigorous scale development methodology. A pilot study consists of data collection and analysis from a small set of subjects, which serves as a guide for the main study (Glass 1997). A pilot study is an experimental study used to prove whether or not a particular instrument or the investigation works. It is also called "pre-testing", or "trying-out". A particular advantage of a pilot study is that it gives preliminary warning about where the main research could potentially fail and where the possibility of research protocol may not be followed correctly, or whether suggested methods or instruments are inappropriate or complicated (Teijlingen and Hundley 2001).

The pilot study was conducted using the online instrument and development teams in South Asia were contacted to respond to the questionnaire. A total of 11 teams and 22 members completed the online instrument. Table 7 displays the demographic information from the data collected. The average team size was 7 members and average team existence was 5.27 months.

Table 8. displays descriptive statistics from the collected data. Table 8. also reports the reliability measure, Cronbach's alpha, for various variables in the instrument. Most reliabilities were adequate and met the stated guideline. A few were low which could be attributed to the small sample size. The pilot study yielded significant information about the instrument which is described next.

Table 7. Demographic Information

Variable	Value	Frequency
Avg. Team Size	7 members	
Average Team Existence	5.27 mths	
Age Range		
	Under 20	0
	20-30	92%
	30-40	8%
	40 & Above	0
Sex		
	Male	72%
	Female	28%
Education		
	Graduate	100%
	Undergraduate	0
	High School	0
Functional Area		
Total of 10 categories, only 3 represented	IS	28%
	R&D	28%
	Other	44%

Table 8. Descriptive Statistics

Construct	Variable	# of items	Cronbach's alpha	Mean	s.d
Diversity			**.763**		
	Surface level Diversity	3	.623	3.58	.975
	Functional Diversity	3	.643	3.34	.901
	Deep Level Diversity	9	.365	4.79	.267
Collaborative Partnership			**.756**		
	Mutual Benefits	3	.731	5.70	.285
	Shared Goals	6	.552	5.61	.227
	Mutual Trust	4	.672	5.64	.238
	Shared Knowledge	3	.528	5.76	.159
	Conflict	7	.879	3.78	.865
Collaborative Technology		**6**	**.799**	**5.43**	**.528**
Task Interdependence		**3**	**.731**	**5.67**	**.257**
GVT Effectiveness		**10**	**.979**	**5.30**	**.845**

Refinement of instrument after the Pilot Study

Qualitative responses from some team members were collected. The focus of the open ended questions was to assess the appropriateness of the items in terms of their wording, meaning, and understandability. Some managers were not happy with some of the words in the questionnaire, so they rewrote some items in their own words. To some managers, some questions were not clear enough and they contacted the researcher for clarification.

For the final instrument, two items were removed as they were worded in similar manner with very less distinction in what they were capturing. One of the items was to measure the conflict construct and the second was to measure task interdependence.

A number of items were reworded to enhance their meaning and capturing the correct response. Another modification to the instrument was removing section titles, which were highlighting the different constructs.

4.8 Ethical Considerations in the Study

Ethical considerations are a significant issue in social research. Fontana and Frey (1998) emphasize that as the object of inquiry in social research is human beings, extreme care has to be taken to avoid any harm to them. Psychological harm such as stress, emotional distress, and self-doubt can trigger sensitive issues and emotional experiences (VanManen 1990). It is also stated in MIS literature that the role of IRB accredited research in MIS is vital one, to creating stability and authority to the studies that researchers perform (Plant and Pons 2006)

To address the ethical issues arising from the instrument and data collection procedures, approval from the Institutional Review Board (IRB), Office of Research Compliance (ORC) at The University of North Carolina at Greensboro (UNCG) was obtained. The IRB acceptance document along with project description, are included as Appendix C and C1. Based on IRB guidelines, the online instrument included a cover page and explained the nature and aims of the research, the entirely voluntary participation, the protection of confidentiality and privacy of participants, the use and

distribution of research finding, the storage of data, data deletion and contact information for researcher, members of the dissertation committee and contact of the IRB compliance officer.

CHAPTER V

DATA ANALYSIS

5. 1 Introduction

This chapter details the analysis of data collected through the field survey. The survey scales were assessed to assure they were reliable, measured their respective constructs, and demonstrated convergent and discriminant validity so they could be used to test the research hypotheses. To aggregate the individual level responses to group level, Inter-rater reliability and agreement was assessed using James $R_{wg(j)}$ index (James et al. 1984) and ICC(1) and ICC(2) (James 1982; Bleise 2000). Once these assessments were confirmed, hypotheses testing for moderator and mediator effects were conducted using Baron & Kenney's (1986) approach of Hierarchical Moderated Regression Analysis (HMRA) and slope analysis.

Based on the research model each construct in the model was comprised of multiple elements measured through multiple items. Thus scale's psychometric properties were assessed at two levels – construct level and element level. For example, construct collaborative partnership comprised of five elements – Mutual Benefits, Shared Goals, Mutual Trust, Shared Knowledge, and Conflict. The scale analysis for this construct was

conducted at construct level –collaborative partnership and also at element or variable level.

The scale assessment for psychometric properties followed a four-step process. First, initial reliability of the scale was assessed using the coefficient alpha, generally referred to as Cronbach's alpha (Cronbach, 1951). Second, to ensure that items measured their respective constructs, construct validity of each item was assessed using Kerlinger's (1978) two methods as detailed by Doll and Torkzadeh (1988): (1) correlation between total scores and item scores was examined at two levels for both overall constructs and also at variable level, (2) factor analysis - exploratory factor analysis was used to assure scale items loaded to a common factor. Third, convergent and dicriminant validity of the scale was assessed using the MTMM approach (Palvia 1996). Fourth, final reliabilities of the modified scales were examined again using Cronbach's alpha approach.

5.2 Data Preparation

After the surveys were administered, several steps were taken to prepare the data for hypothesis testing. First all data was initially gathered into a master Excel spreadsheet. Excel was chosen because of three primary reasons. First is its interoperability with commonly available statistical package. Second, it provides tools and features to undertake primary data analysis. Third, the online data collected from the online survey administration was available for export in MS Excel format.

Initial review of the data revealed a few inconsistencies in some of the responses. These responses were dropped from the final analysis thus leading to a total of 213 usable responses from 58 teams.

Once the data was exported into MS Excel, each and every response was coded using the following scale – Strongly Disagree – 1, Disagree – 2, Somewhat Disagree – 3, Neutral – 4, Somewhat Agree – 5, Agree – 6, and Strongly Agree – 7. A few of the items were reverse coded to depict the accurate level of the response.

Calculation of the mean, standard deviation, normality tests, and histograms helped determine appropriateness of data for further analysis. The data distributions were generally symmetrical. The histograms revealed no signs of bimodality, skewness and kurtosis of item responses was well within acceptable ranges. The next section details the demographic and descriptive analysis of the final data set utilized for the hypotheses testing.

5.3 Sample Demographics

The sample of 213 responses was analyzed for demographics based on gender, age, racial/ethnic background, functional area with most experience, and educational level.

Table 9. Gender Demographic

Gender	Percentage
Male	70%
Female	30%

Table 10. Age Demographic

Age range	Percentage
Less than 25	3%
25-35	54%
35-45	31%
Greater than 45	11%

Table 11. Racial/ethnic Demographic

Ethnic Background	Percentage
White or Caucasian	37%
Asian	45%
Black or African American	8%
Hispanic or Latino	8%
Native Hawaiian or other Pacific Islander	1%
American Indian or Alaskan Native	0%
Other	1%

Table 12. Functional Area

Functional Area	Percentage
Accounting/Finance	2%
Customer Service	6%
Engineering	13%
Human Resources	0%
Information Systems	44%
Management	10%
Operations	8%
Purchasing/Procurement	6%
R&D	10%
Sales & Marketing	1%
Other	0%

Table 12 clearly indicates the level of functional diversity present in GVT included in the sample. The evidence of no team member belonging to Human Resources

functional area was interesting. One possible reason could be that most of the organizations have their human resources at one central location. Another reason could be that the task or project being accomplished by the team has no requirement for any personnel with human resources background. Another significant observation evident is that global virtual teams cut across many functional areas within an organization (Paul et al. 2004).

Table 13. Educational Background

Educational Background	Percentage
Doctorate	5%
Graduate Studies	58%
Undergraduate Level Studies	32%
High School or Lower	3%
Other	2%

Table 13. provides evidence of educational diversity present in global virtual teams. Although, most of the members had either graduate or undergraduate educational background, the presence of other categories, totaling 10% , cannot be ignored.

Table 14. Industry Classification

Industry	Percentage
Information Systems	41%
Manufacturing	17%
Telecommunications	21%
Banking & Finance	14%
Other	7%

It is no surprise that the IS industry is heavily represented in the domain of GVT implementation, 41% (Table 14.), because software development relies on the collective skills of members and their efforts to build the software. Furthermore, social processes of communication and coordination are central in software development (Wong and Burton 2000). The average team size is 11.2 members and average team tenure is 9.2 months.

Table 15. Countries Represented

Countries Represented (ascending order)			
Argentina Brazil Canada China Finland Germany India Indonesia Italy		Korea Mexico Netherlands Oman Philippines Singapore UK Ukraine USA	

Table 15. shows the different countries represented by the global virtual teams in the sample. Most of the teams spanned a minimum of two countries, with some teams spanning 4 countries. This clearly depicts the tru global nature of the teams under study.

5.4 Media Usage

This section sheds some light on the media usage by global virtual teams. The simplest and most widely introduced forms of technology are telephone and email. Face-

to-face meetings were used to varying degrees in the teams. Responses indicate popularity of groupware technology and group tele-conference. Surprising to note was the scarce use of video-conferencing in global virtual teams. The Following sub-sections report the frequency of responses for various media for communication.

Table 16. Frequency of Face to Face Interaction

Occurrence	Frequency
Never/Not Applicable	46%
Daily	6%
Once a week	1%
A few times a week	2%
Once a month	15%
Less than once a month	30%

A high percentage (76%) of responses indicates no face-to-face interaction or it being used less than once a month. This is representative of the true nature of global virtual teams.

Table 17. Frequency of Phone Usage

Occurrence	Frequency
Never/Not Applicable	3%
Daily	31%
Once a week	11%
A few times a week	47%
Once a month	4%
Less than once a month	4%

Consistent with existing research on CMC and media usage in GVT, results indicate traditional phone systems are still popular means of communication in distance collaboration (Teasley and Wolinsky 2001). A total of 69% of responses indicate phones being used on weekly or daily basis.

Table 18. Frequency of E-Mail Usage

Occurrence	Frequency
Never/Not Applicable	0%
Daily	67%
Once a week	3%
A few times a week	28%
Once a month	0%
Less than once a month	1%

Email is the most widely used communication medium in global virtual teams. Sixty seven percent of responses indicate that e-mail is used daily for interaction and transferring information. A total of 98% of responses categorized email use either on weekly and daily basis. These findings resonate with existing literature (Kettinger and Grover 1997; Pauleen and Yoong 2001), according to which significant reasons for e-mail's heavy use include universal platform, cost effectiveness, accessibility, easy learning curve, and both sender and recipient control over the timing of the communication.

Table 19. Frequency of Group Tele-Conference Usage

Occurrence	Frequency
Never/Not Applicable	7%
Daily	4%
Once a week	56%
A few times a week	15%
Once a month	11%
Less than once a month	7%

Similar to phone communication, but with multiple members, a total of 75% of responses indicate using group tele-conference on a weekly or daily basis. Further, interesting to note is the very high percentage for once a week category, signifying a fixed time or date for conference calls.

Table 20. Frequency of Video Conference Usage

Occurrence	Frequency
Never/Not Applicable	63%
Daily	0%
Once a week	0%
A few times a week	0%
Once a month	16%
Less than once a month	21%

Table 20. details the use of video-conferencing use in GVT. It is surprising to note very less usage of this communication medium. Sixty three percent of responses indicated never/not applicable and 37% indicated use on a monthly basis. Pauleen and

Yoong (2001) point out that in the past, the costs were very high, and the quality was not very good. Presently, new technology has improved the quality of transmission the costs are being reduced by Internet-based desktop videoconferencing.

Table 21. Frequency of Groupware Usage

Occurrence	Frequency
Never/Not Applicable	15%
Daily	40%
Once a week	8%
A few times a week	30%
Once a month	4%
Less than once a month	2%

Groupware includes technologies like Electronic Meeting Systems, chat applications, desktop conferencing, discussion boards, workflow applications, shared white boards, and group decision support systems. Seventy eight percent of responses were categorized on weekly or daily basis, indicating high use of such technologies in collaborative and distance work.

5.5 Descriptive Statistics

The descriptive statistics of all the items is reported in Table 22. Reported statistics include minimum (Min), maximum (Max), Mean, Standard Deviation (S.D.), Skewness, and Kurtosis

.

Table 22. Descriptive Statistics

Construct		Item	Min	Max	Mean	SD	Skewness	Kurtosis
Diversity	Surface Level Diversity	AGE	2	7	5.207	1.007	-1.125	1.583
		ETHNICITY	2	7	5.601	0.964	-1.294	1.204
		GENDER	2	7	5.338	1.107	-1.375	1.876
	Functional Level Diversity	FUNCEXP	1	7	4.972	1.274	-0.901	0.806
		EDUBG	2	7	5.038	1.136	-0.990	0.571
		ORGEXP	2	7	5.066	1.276	-0.977	0.285
	Deep Level Diversity	PERSVAL	2	6	3.437	1.245	0.516	-0.899
		PERSONALITY	1	7	3.479	1.341	0.401	-0.975
		ATTPRJ	1	6	3.362	1.231	0.507	-0.915
		ATTPRJGLS	1	7	3.366	1.427	0.514	-0.754
		WELLFELLMEM	1	7	3.235	1.360	0.418	-0.653
		MAINHARM	1	7	2.948	1.471	0.521	-0.731
		LIKESHINFO	1	7	3.192	1.510	0.715	-0.343
		LIKECNSLTG	1	7	2.962	1.407	0.754	-0.172
		HELPFELL	1	7	2.808	1.362	0.919	0.131
Collaborative Partnership								
	Mutual Benefits	MBMEMSHRISK	2	7	5.418	0.985	-0.919	1.371
		MBMEMCOLLRESP	1	7	5.333	0.970	-1.025	2.693
		MBTEAMAWD	2	7	5.366	0.940	-1.068	2.012
	Shared Goals	SGCLDEF	1	7	5.469	1.030	-0.910	1.438
		SGNOBWORTH	2	7	5.451	0.913	-0.641	0.899
		SGACHOPP	2	7	5.526	0.988	-0.975	1.400
		SGCHLLABL	2	7	5.399	0.888	-0.507	1.261
		SGCLCONSEQ	3	7	5.390	0.892	-0.891	0.985
		SGCOLLAGG	2	7	5.164	0.945	-0.538	1.261
	Mutual Trust	MTCONSIDFEEL	2	7	5.469	0.969	-0.777	1.179
		MTMEMFRND	2	7	5.385	0.897	-0.363	1.000
		MTMEMREL	2	7	5.394	0.860	-0.858	1.666
		MTMEMTRSTWRTHY	3	7	5.587	0.970	-0.779	0.602
	Shared Knowledge	SKSHDOCS	2	7	5.498	0.974	-0.920	1.338
		SKEXPKH	2	7	5.385	0.897	-0.482	1.118
		SKSK	3	7	5.418	0.852	-0.827	1.039
	Conflict	COPERCLASHES	1	7	3.545	1.347	0.337	-0.793
		COINTERPERS	1	6	3.380	1.339	0.634	-0.728
		CODISNONWORK	1	6	3.549	1.337	0.558	-0.745
		COIDEAS	1	7	3.775	1.379	0.303	-1.034
		CODISTASKS	1	6	3.113	1.164	0.684	-0.131
		CODISRESP	1	7	3.211	1.169	0.798	0.629
		CODISRESOUR	1	6	3.249	1.217	0.575	-0.321

Construct		Item	Min	Max	Mean	SD	Skewness	Kurtosis
Task	Task Interdependence	TIRELYINFO	3	7	5.535	0.871	-0.670	1.057
		TITASKRELA	2	7	5.366	0.910	-0.640	1.146
		TIOBINFO	2	7	5.394	0.908	-0.864	1.337
	Task Complexity	TCREQTECH	2	7	5.643	0.964	-0.732	1.176
		TCPS	3	7	5.427	0.825	-0.428	0.570
		TCCT	1	7	5.192	0.959	-1.333	2.741
	Task Variety	TVENCVAR	1	7	5.610	0.953	-1.194	1.268
		TVDIFFOPP	1	7	5.268	1.004	-0.982	1.823
		TVDIFFMETH	2	7	5.286	0.989	-1.073	1.633
		CTEQP	1	7	5.319	1.047	-1.218	2.310
		CTPARATASK	3	7	5.521	0.866	-0.659	1.068
		CTVIEWOTH	1	7	5.554	0.854	-0.927	1.340
		CTMODIFY	1	7	5.357	1.075	-1.372	2.384
		CTSOCRELN	1	7	5.254	0.977	-0.957	2.153
		CTKS	3	7	5.624	0.720	-0.597	1.437
GVTE	GVTE Performance	GVTEGOALS	1	7	5.174	1.167	-0.703	0.345
		GVTEBSOBJ	1	7	5.183	1.209	-0.794	0.342
		GVTETIME	2	7	4.962	1.181	-0.360	-0.292
		GVTEBUDGET	2	7	4.958	1.253	-0.792	-0.042
		GVTEEFF	2	7	4.901	1.159	-0.411	-0.364
		GVTEQLTY	2	7	4.845	1.247	-0.630	-0.213
	Member Satisfaction	GVTEINPUTVAL	2	7	5.202	1.146	-0.650	-0.035
		GVTEHGMORALE	2	7	5.080	0.994	-0.481	0.920
		GVTENJOYPART	1	7	5.192	1.093	-1.331	2.081
		GVTEFUTUREPART	2	7	5.254	1.024	-0.286	-0.136

By looking at the data and various descriptive it is evident that all the Skewness statistics for all the items is well within the acceptable range. *Skewness* is the tilt (or lack of it) in a distribution. A common rule-of-thumb test for normality is to run descriptive statistics to get skewness and kurtosis. Skew should be within the +2 to -2 range when the data are normally distributed. Some authors use +1 to -1 as a more stringent criterion when normality is critical. Negative skew is left-leaning, positive skew right-leaning. None of the skew statistic on any of the item is above or below the range

Kurtosis is the peakedness of a distribution. Kurtosis also should be within the +2 to -2 range when the data are normally distributed; a few authors use the more lenient +3 to -3. Negative kurtosis indicates too many cases in the tails of the distribution. Positive kurtosis indicates too few cases in the tails. Except for a few items, most items fall well within the normally distributed data range.

Descriptive Statistics at the Element Level

Element level data was generated by averaging the responses on all the items belonging to that element. Table 23. presents the descriptive analysis of various constructs.

Table 23. Descriptive Statistics at Element Level

Construct	# of Items	Min	Max	Mean	S.D	Skewness	Kurtosis
Surface Level Diversity	3	2.000	7	5.382	0.800	-1.168	1.016
Functional Level Diversity	3	2.000	7	5.025	1.048	-0.738	0.146
Deep Level Diversity	9	1.125	6	3.199	1.131	0.532	-0.717
Mutual Benefits	3	2.000	7	5.372	0.857	-0.810	1.714
Shared Goals	6	2.833	7	5.400	0.770	-0.423	0.881
Mutual Trust	4	3.000	7	5.459	0.800	-0.518	0.752
Shared Knowledge	3	2.667	7	5.433	0.815	-0.580	1.047
Conflict	7	1.286	6	3.403	0.931	0.213	-0.195
Task Interdependence	3	3.000	7	5.432	0.809	-0.576	0.964
Task Complexity	3	3.000	7	5.421	0.705	-0.508	0.829
Task Variability	3	2.000	7	5.388	0.749	-0.773	1.936
Collaborative Technology	6	2.000	7	5.438	0.712	-0.502	2.535
GVT Effectiveness - Performance	6	2.333	7	5.004	1.039	-0.329	-0.434
GVT Effectiveness - Satisfaction	4	2.000	7	5.182	0.889	-0.467	0.782
Total	63						

Normality is established for construct level data by examining the range of skewness and kurtosis

5.6 Validity of the Scales

A scale is valid if its measures actually measure what they claim to, and if there are no logical errors in drawing conclusions from the data (Straub and Carlson 1989). To assess the validity of the scales employed in this study, a four step approach was administered to determine the construct, convergent and discriminant validity of the scales.

Step 1 involved analyzing the element reliabilities. Cronbach's alpha was used as statistic and internal consistency method was used to assess reliability. *Cronbach's* α is commonly used to establish internal consistency construct validity, with .60 considered acceptable for exploratory purposes, .70 considered adequate for confirmatory purposes, and .80 considered good for confirmatory purposes (Doll and Torkzadeh 1988; Straub and Carlson 1989).

In step 2, item-to-corrected total correlations for both construct and element level were examined. As explained by Doll and Torkzadeh (1988), the extent to which the item correlates with the total score is indicative of construct validity for the item. The procedure followed is to subtract the item from the total score in order to avoid spurious part-whole correlation and calculate corrected item total score. This corrected item total score is then correlated with the item score. Further exploratory factor analysis was conducted to assure constructs were distinct. Principal components analysis was used as

the factoring methodology with varimax rotation. This analysis resulted in re-organizing the elements of different constructs and assessing unidimensionality of the elements.

Step 3 included examining the convergent and disriminant validity using the multitrait-multimethod matrix (MTMM) approach (Cambell and Fiske, 1959; Doll and Torkzadeh, 1989; Palvia, 1996). Convergent validity tests whether the correlations between measures of the same variable are higher than zero and large enough to proceed with discriminant validity. Discriminant validity is tested for each item by counting the number of times it correlates more highly with an item of another variable than with items of its own theoretical variable.

In step 4, final reliabilities of all the scales was reassessed and analyzed to determine a more reliable scale for measurement of various variables and constructs.

The following chapters will detail the above mentioned steps and analysis of results is presented under each section.

5.6.1 Initial Reliability

Cronbach α was computed for the entire model as well as for scales measuring each element. Table 24. presents the initial reliability at the element level. The reliability coefficient for the 63 item instrument was .907. The reliability coefficients for different variables range between 0.64 – 0.93. These scores are considered high and warrant for validity analysis. The internal consistency of the measures is established and thus it can be safely interpreted that various items are measuring consistently the variables they are suppose to measure.

Table 24. Initial Reliabilities

Construct	# of Items	Reliability
Surface Diversity	3	0.675
Functional Diversity	3	0.811
Deep Diversity	9	0.94
Mutual Benefits	3	0.865
Shared Goals	6	0.900
Mutual Trust	4	0.888
Shared Knowledge	3	0.878
Conflict	7	0.851
Task Interdependence	3	0.886
Task Complexity	3	0.651
Task Variability	3	0.640
Collaborative Technology	6	0.857
GVT Effectiveness -Performance	6	0.932
GVT Effectiveness -Satisfaction	4	0.854
Total	63	**0.907**

5.6.2 Item-to-Corrected Total Correlations

Based on the approach of Kerlinger (1978), construct validity of the scales for various constructs was further examined by analyzing item-to-corrected total correlations for both construct and element level. As noted by Nunnally (1978) "Items within a measure are useful only to the extent that they share a common core-the attribute which is to be measured...the items that correlate most highly with total scores are the best items for a general-purpose test".

The item-to-corrected total correlations for the construct level were obtained by computing the correlation of the item with the corrected item total of the construct. That

is the in calculating the total for the construct, the particular item under examination was dropped and then its correlation with corrected total was obtained. Similarly, item-to-total correlations analysis for the element level was performed by dropping the item under examination from calculating the total for the variable and then correlation between the item and the corrected total for the element were analyzed. Tables 25 to 29 report both the item-to-total corrected construct and item-to-total corrected variable correlations for all the constructs and variables present in the study.

Table 25. Item – To- Corrected Total Correlations Diversity Construct

Construct	Element	Item	Construct Level	Element Level
Diversity	Surface Level Diversity	Age	**0.24**	**0.36**
		ETHNICITY	**0.10**	0.65
		GENDER	**0.03**	0.49
	Functional Level Diversity	FUNCEXP	**0.35**	0.70
		EDUBG	**0.41**	0.71
		ORGEXP	**0.32**	0.58
	Deep Level Diversity	PERSVAL	0.72	0.78
		PERSONALITY	0.76	0.79
		ATTPRJ	0.78	0.82
		ATTPRJGLS	0.75	0.82
		WELLFELLMEM	0.75	0.82
		MAINHARM	0.73	0.79
		LIKESHINFO	0.63	0.76
		LIKECNSLTG	0.60	0.73
		HELPFELL	0.53	0.65

Table 26. Item – To- Corrected Total Correlations Collaborative Partnership Construct

Construct	Element	Item	Construct Level	Element Level
Collaborative Partnership				
	Mutual Benefits	MBMEMSHRISK	0.74	0.81
		MBMEMCOLLRESP	0.68	0.75
		MBTEAMAWD	0.64	0.67
	Shared Goals	SGCLDEF	0.63	0.76
		SGNOBWORTH	0.61	0.76
		SGACHOPP	0.74	0.80
		SGCHLLABL	0.69	0.70
		SGCLCONSEQ	0.66	0.73
		SGCOLLAGG	0.44	0.62
	Mutual Trust	MTCONSIDFEEL	0.71	0.79
		MTMEMFRND	0.63	0.70
		MTMEMREL	0.67	0.80
		MTMEMTRSTWRTHY	0.62	0.73
	Shared Knowledge	SKSHDOCS	0.73	0.78
		SKEXPKH	0.68	0.77
		SKSK	0.71	0.75
	Conflict	COPERCLASHES	**0.15**	0.70
		COINTERPERS	**0.09**	0.61
		CODISNONWORK	**0.19**	0.64
		COIDEAS	**0.12**	0.52
		CODISTASKS	**0.09**	0.66
		CODISRESP	**0.06**	0.67
		CODISRESOUR	**0.01**	0.50

Table 27. Item – To- Corrected Total Correlations Task Construct

Construct	Element	Item	Construct Level	Element Level
Task	Task Interdependence	TIRELYINFO	0.63	0.81
		TITASKRELA	0.60	0.78
		TIOBINFO	0.56	0.74
	Task Complexity	TCREQTECH	0.62	0.49
		TCPS	**0.51**	0.54
		TCCT	**0.46**	**0.38**
	Task Variety	TVENCVAR	**0.46**	**0.37**
		TVDIFFOPP	**0.43**	0.59
		TVDIFFMETH	**0.48**	0.40

Table 28. Item – To- Corrected Total Correlations Collaborative Technology Construct

Construct	Item	Construct Level	Element Level
Collaborative Technology			
	CTEQP	0.54	0.54
	CTPARATASK	0.68	0.68
	CTVIEWOTH	0.75	0.75
	CTMODIFY	0.62	0.62
	CTSOCRELN	0.66	0.66
	CTKS	0.70	0.70

Table 29. Item – To- Corrected Total Correlations GVT Effectiveness Construct

Construct	Element	Item	Construct Level	Element Level
Global Virtual Team Effectiveness	GVTE Performance	GVTEGOALS	0.73	0.69
		GVTEBSOBJ	0.80	0.78
		GVTETIME	0.81	0.84
		GVTEBUDGET	0.81	0.82
		GVTEEFF	0.77	0.82
		GVTEQLTY	0.82	0.85
	Member Satisfaction	GVTEINPUTVAL	0.79	0.69
		GVTEHGMORALE	0.76	0.80
		GVTENJOYPART	0.72	0.71
		GVTEFUTUREPART	0.49	0.60

In the literature, it is recommended that an item be removed or further analyzed if the item-to-corrected total correlations fall below 0.4 (Doll and Torkzadeh 1988; Palvia 1996). It is also accepted that the cut-offs for deciding acceptable item-to-total correlations are somewhat arbitrary and there are no acceptable standards. Since analysis was performed at two levels, element level and construct level, it is prudent to have two cutoffs. For the element level, a higher level of cutoff of 0.5 is preferred as items should

measure the underlying element they intend to measure. Whereas for the construct level analysis a cutoff for 0.4 is used as items are measuring the elements and not the construct directly.

After analyzing the reported correlation from the table 25., it is evident that in the construct diversity, element surface level diversity and functional level diversity are different than deep level diversity. This is also confirmed in the literature that diversity within teams or small organizational groups should be assessed separately (Harrison et al. 2002). Previous studies that examined the effects of diversity on team member perceptions and attitudes have frequently taken a one-dimensional view and argued for or against homogeneous or heterogeneous groups (Kirkman et al. 2004). Therefore, it is considered to keep deep level diversity separate from surface level diversity and functional level diversity.

Under the collaborative partnership construct, items belonging to variable conflict have item-to-total correlations below the selected cut-off. Early group theorists have focuses on the negative consequences of conflict for teams. Conflict affects communications between individuals, breaks personal and professional relationships, and reduces effectiveness, because it produces tension and distracts team members from performing the task (Hackman and Morris 1975; Wall and Callister 1995). Thus, it is no surprise that today's managers and employees still overwhelmingly view conflict as negative and something to be avoided or resolved as soon as possible (Stone 1995). Alternatively, recent literature suggests that conflict may be beneficial to team performance. Suppressing conflict could reduce creativity, innovation, performance,

quality of decisions, and communication between group's members (De Dreu and Van de Vliert 1997). Thus in light of these diverse literature findings it is wise to treat conflict separately from other elements of collaborative partnership.

Under the construct task, items belonging to variables task complexity and task variety have low correlation than the selected cut off of .50. Also an item each in task complexity and task variety has slightly low correlation than the cut off. These items could be marginal candidate for dropping, but then it leaves only two items to measure the elements. It is prescribed in various instrument and variable measurement studies that there should be at least a minimum of three items per variable. Thus, it was decided not to drop these items and treat task complexity and task variety separate from task interdependence variable.

The construct global virtual team effectiveness has two elements GVT performance and GVT member satisfaction. Low correlation among the items belonging to these two elements was not observed. It is therefore possible to combine these two elements as a single construct. Results from exploratory factor analysis would be analyzed to take a decision on this construct.

The remaining item-to-corrected total construct and item-to-corrected total variable correlations are under acceptable limits. The emergence of elements not relating to a single construct warranted performing a second level of analysis. The following section details and reports our examinations from conducting exploratory factor analysis on scales measuring diversity, task, collaborative technology, collaborative partnership, and global virtual team effectiveness.

5.6.3 Exploratory Factor Analysis (EFA)

Using SPSS v.15, an exploratory factor analysis was performed on various scales used in the measurement of constructs. *Factor analysis* is used to uncover the latent structure (dimensions) of a set of variables. It reduces attribute space from a larger number of variables to a smaller number of factors and as such is a "non-dependent" procedure (that is, it does not assume a dependent variable is specified). In research studies, factor analysis is used for multiple purposes. Our primary purpose for using factor analysis is to validate a scale or index by demonstrating that its constituent items load on the same factor, and to drop proposed scale items which cross-load on more than one factor. We used the Principal Components Analysis (PCA) with Kaiser criterion and Varimax rotation technique. The results are reported in table 30. to table 34. Only rotated component matrices are presented.

Diversity

Table 30. Exploratory Factor Analysis - Diversity Construct

Rotated Component Matrix(a)			
	Component		
	1	2	3
AGE	0.095	0.484	**0.319**
ETHNICITY	-0.057	0.409	**0.688**
GENDER	-0.065	0.266	**0.716**
FUNCEXP	0.082	**0.848**	0.116
EDUBG	0.128	**0.858**	0.090
ORGEXP	0.078	**0.743**	0.095
PERSVAL	**0.884**	0.028	0.131
PERSONALITY	**0.890**	0.082	0.143
ATTPRJ	**0.899**	0.100	0.081
ATTPRJGLS	**0.893**	0.051	0.041
WELLFELLMEM	**0.830**	0.155	-0.166
MAINHARM	**0.775**	0.199	-0.267
LIKESHINFO	**0.733**	0.087	-0.423
LIKECNSLTG	**0.729**	-0.003	-0.337
HELPFELL	**0.619**	0.100	-0.486

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
A Rotation converged in 6 iterations.

Exploratory Factor Analysis for construct diversity revealed 3 distinct components - Surface level diversity, functional level diversity, and deep level diversity. This is in accordance with our initial proposition and goal to examine the three levels of diversity distinct from each other.

Collaborative Partnership

Table 31. Exploratory Factor Analysis - Collaborative Partnership Construct

Rotated Component Matrix(a)		
	Component	
	1	2
MBMEMSHRISK	**0.845**	0.178
MBMEMCOLLRESP	**0.826**	0.114
MBTEAMAWD	**0.810**	0.048
SGCLDEF	**0.751**	0.121
SGNOBWORTH	**0.744**	0.096
SGACHOPP	**0.877**	0.134
SGCHLLABL	**0.831**	0.125
SGCLCONSEQ	**0.825**	0.066
SGCOLLAGG	**0.682**	-0.112
MTCONSIDFEEL	**0.852**	0.117
MTMEMFRND	**0.794**	0.077
MTMEMREL	**0.861**	0.038
MTMEMTRSTWORTHY	**0.741**	0.120
SKSHDOCS	**0.862**	0.149
SKEXPKH	**0.824**	0.126
SKSK	**0.855**	0.096
COPERCLASEHS	-0.253	**0.763**
COINTERPERS	-0.264	**0.682**
CODISNONWORK	-0.185	**0.724**
COIDEAS	-0.189	**0.625**
CODISTASKS	-0.306	**0.704**
CODISRESP	-0.341	**0.697**
CODISRESOUR	-0.296	**0.554**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
A. Rotation converged in 8 iterations.

Again as was evident from item-to-total correlations analysis, items pertaining to element conflict have higher factor loadings on component 2. These results also warrant use of conflict as a separate construct distinct from other elements of collaborative partnership.

Task

Table 32. Exploratory Factor Analysis - Task Construct

Rotated Component Matrix(a)		
	Component	
	1	2
TIRELYINFO	**0.894**	0.174
TITASKRELA	**0.889**	0.153
TIOBINFO	**0.837**	0.143
TCREQTECH	0.489	**0.550**
TCPS	0.377	**0.516**
TCCT	0.167	**0.641**
TVENCVAR	0.227	**0.578**
TVDIFFOPP	-0.039	**0.793**
TVDIFFMETH	0.119	**0.718**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
A Rotation converged in 3 iterations.

EFA reveals two distinct factors with items pertaining to task interdependence loading on one component and items pertaining to task complexity and task variety loading on second component. Therefore, task complexity and task variety were combined as a single scale, a modification which is supported theoretically in existing literature. Van de Ven and Delbecq (1974) recognized the strong correlation between complexity and variety and collapsed them into a single variable noting that "taken together, task complexity and variability constitute the major dimensions of task uncertainty". This new variable called 'task complexity' is created by averaging the measures of task complexity and task variety.

Collaborative Technology

Table 33. Exploratory Factor Analysis - Collaborative Technology Construct

Component Matrix(a) (b)	
	Component
	1
CTEQP	**0.669**
CTPARATASK	**0.809**
CTVIEWOTH	**0.852**
CTMODIFY	**0.744**
CTSOCRELN	**0.766**
CTKS	**0.805**

Extraction Method: Principal Component Analysis.
A 1 components extracted.
B. The solution could not be rotated.

Exploratory factor analysis clearly revealed unidimensionality of the items under collaborative technology construct with all the items loading on a single component.

Global Virtual Team Effectiveness

Table 34. Exploratory Factor Analysis - GVT Effectiveness Construct

Rotated Component Matrix(a)		
	Component	
	1	2
GVTEGOALS	**0.783**	0.088
GVTEBSOBJ	**0.842**	-0.018
GVTETIME	**0.856**	-0.232
GVTEBUDGET	**0.854**	-0.302
GVTEEFF	**0.826**	-0.314
GVTEQLTY	**0.860**	-0.340
GVTEINPITVAL	**0.837**	0.110
GVTEHGHMORALE	**0.810**	0.381
GVTENJOYPART	**0.778**	0.214
GVTEFUTUREPART	**0.561**	0.690

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
A Rotation converged in 3 iterations.

All the items from the two elements load on a single component, with an exception being item GVTEFUTUREPART which cross loads highly on both the factors. Looking at these loadings, it was decided to merge these two elements under the umbrella construct Global Virtual Team Effectiveness. This is supported in literature both empirically and theoretically (Stewart and Barrack, 2000; Chatman and Flynn, 2001).

In summary, based on the results of previous two analysis, item-to-total correlations and exploratory factor analysis, and also keeping in consideration the theoretical arguments provided before, it was decided to (a) divide the construct diversity into three elements – surface level, functional level, and deep level diversity, (b) treat conflict as a separate construct from the other elements of collaborative partnership, (c) separate out the effects of task interdependence and combine task complexity and task variety, (d) combine the two variables of GVT Effectiveness under an umbrella construct.

5.6.4 Convergent and Discriminant Validity

Convergent validity is assessed by the correlation among items which make up the scale or instrument measuring a construct (internal consistency validity). Internal consistency is a type of convergent validity which seeks to assure there is at least moderate correlation among the indicators for a concept. *Discriminant validity*, the second major type of construct validity, refers to the principle that the indicators for different constructs should not be so highly correlated as to lead one to conclude that they measure the same thing. The Multitrait-multimethod matrix (MTMM) approach (Cambell and Fiske 1959; Doll and Torkzadeh 1989; Palvia 1996) was used to assess these two

validities. Convergent Validity test whether the correlations between measures of the same construct are higher then zero and large enough to proceed with discriminant validity analysis. The matrix is attached as Appendix C due to page width considerations. It can be observed that for every single construct, the correlations in the validity diagonal (in bold) are higher than zero ($p<0.001$), thus establishing the convergent validity of the scales.

Under the MTMM approach, discriminant validity for each item is tested by computing the number of times (k) that the item correlates higher with items of other variables than with items of its own variable. For example, the lowest own-construct correlation for item MBMEMSHRISK is 0.509 and this correlation is lower than 3 correlations of this item with items from other variables, thus k = 3. Table 34 reports the k values of all the items. Further, Cambell and Fiske (1959) suggest that, for discriminant validity, the value of k should be less then 50% of the potential comparisons. Evident from Table 35., there are 52 potential comparisons, which translate that value of k should be less than 26. It is evident from the above table that all the value of k satisfies this criterion and hence there are no violations of discriminant validity. Having met the requirements of convergent and discriminant validity, the scales are finalized based on above analysis and in the following section, final reliabilities are reported at both variable and construct level. Complete MTMM matrix is included as Appendix D.[1]

[1] Only the Multi-Trait analysis is conducted. The data collection involved only a single method for collecting data. It is referred to as MTMM to maintain the consistency with existing literature (Doll and Torkzadeh 1989; Palvia 1996).

Table 35 Discriminant Validity Analysis

Item	K		Item	K		Item	K
AGE	4		MBMEMSHRISK	3		TIRELYINFO	4
ETHNICITY	3		MBMEMCOLLRESP	3		TITASKRELA	4
GENDER	8		MBTEAMAWD	4		TIOBINFO	3
FUNCEXP	0		SGCLDEF	0		TCREQTECH	24
EDUBG	0		SGNOBWORTH	3		TCPS	25
ORGEXP	0		SGACHOPP	3		TCCT	16
PERSONALITY	0		SGCHLLABL	6		TVENCVAR	23
ATTPRJ	0		SGCLCONSEQ	5		TVDIFFOPP	3
ATTPRJGLS	0		SGCOLLAGG	1		TVDIFFMETH	25
WELLFELLMEM	0		MTCONSIDFEEL	3		CTEQP	14
MAINHARM	0		MTMEMFRND	5		CTPARATASK	16
LIKESHINFO	0		MTMEMREL	2		CTVIEWOTH	17
LIKECNSLTG	0		MTMEMTRSTWORTHY	3		CTMODIFY	13
HELPFELL	0		SKSHDOCS	5		CTSOCRELN	8
			SKEXPKH	7		CTKS	8
			SKSK	4			
			COPERCLASEHS	0			
			COINTERPERS	0			
			CODISNONWORK	0			
			COIDEAS	7			
			CODISTASKS	0			
			CODISRESP	0			
			CODISRESOUR	0			

5.6.5 Final Reliabilities

Post the validity analysis, final reliabilities of the elements and construct scales were calculated. Table 36. reports the final reliabilities. All the measurement scales at the construct level display a high reliability. Validity analysis resulted in the formation of 9 different constructs.

Table 36. Final Reliabilities

Construct	Element	#of Items	Reliabilities
Surface Diversity	Surface Diversity	3	0.675
Functional Diversity	Functional Diversity	3	0.811
Deep Diversity	Deep Diversity	9	0.94
Collaborative Partnership	Mutual Benefits	16	0.964
	Shared Goals		
	Mutual Trust		
	Shared Knowledge		
Conflict	Conflict	7	0.851
Task Interdependence	Task Interdependence	3	0.886
Task Complexity	Task Complexity	6	0.713
	Task Variability		
Collaborative Technology	Collaborative Technology	6	0.857
GVT Effectiveness	GVT Effectiveness - Performance	10	0.859
	GVT Effectiveness - Satisfaction		
	Total	63	

5.7 Data Aggregation

As explained in the research design chapter, an informant sampling approach was utilized to collect responses for various constructs in the study. This approach is based on the assumption that informant ratings reflect a shared reality within each team. Proponents of this approach also state that, since some variance across informants is to be expected, the informant approach involves sampling several informants so that inter-rater reliability can be assessed and, if, convergence is demonstrated, a "balanced perspective" can be obtained by "averaging informants' perceptions" (Van der Vegt and Bunderson 2005).

The expectation is that the ratings from different informants from a single GVT are similar to one another and, furthermore, that they are more similar to one another than they are to informant ratings from other teams (Bliese 2000). The most common indicator of the validity of aggregated group-level constructs is probably within-group agreement (Klein et al. 2001; Klein and Kozlowski, 2000). It refers to the degree to which responses from individuals are interchangeable; that is, agreement reflects the degree to which raters provide essentially the same rating. A measure of within-group agreement that is widely applied is the $R_{wg}(J)$ index for multiple items (James et al. 1984). This index is obtained by comparing the observed variance on a set of items in a group to the variance that would be expected if the group members would respond randomly. The higher the $R_{wg}(J)$ value, the more group members agree with respect to the value of the target variable. The $R_{wg}(J)$ index is calculated separately for each group. As a rule of thumb, values of .70 or higher are considered to represent satisfactory agreement (George 1990; James et al. 1984). Table 36. reports the averaged inter-rater agreement coefficient for each element and also for each construct.

Table 37. James Rwg (j) Index for Construct and Elements

Construct	Element	Rwg (j) -	Rwg(j)
Surface Diversity	Surface Diversity	0.905	0.905
Functional Diversity	Functional Diversity	0.803	0.803
Deep Diversity	Deep Diversity	0.691	0.691
Collaborative Partnership	Mutual Benefits	0.908	0.913
	Shared Goals	0.916	
	Mutual Trust	0.902	
	Shared Knowledge	0.912	
Conflict	Conflict	0.801	0.801
Task Interdependence	Task Interdependence	0.900	0.900
Task Complexity	Task Complexity	0.934	0.932
	Task Variability	0.926	
Collaborative Technology	Collaborative Technology	0.937	0.937
GVT Effectiveness	GVT Effectiveness -Performance	0.798	0.833
	GVT Effectiveness -Satisfaction	0.860	
	Total	**0.870**	**0.857**

To further assess the degree of variability in responses at the individual level that is attributed to team membership Interclass Correlation Coefficients (ICC) values were calculated based on the methods described by Bliese (2000). The intra-class correlation coefficient (ICC) encompasses both within-group and between-group variance. ICC is generally interpreted as the proportion of variance in a target variable that is accounted for by group membership (James 1982). ICC is calculated as the ratio of between-group variance to total variance, and yields a single value for the entire sample. James (1982) interprets ICC(1) as a measure of inter-rater reliability, that is extent to which raters are substitutable, and recommends it as a criteria for aggregating. Alternatively, Bryk and Raudenbush (1982) interpret ICC(1) as the proportion of total variance in the scale that

can be explained by group membership. In literature, a range of .00 to .50 is considered appropriate (James 1982; Stewart and Barrick 2000).

Also reliability of the group means, as measured by ICC(2) was computed. ICC(2) pertains to the reliability of means and not the agreement among individuals (James 1982). In other words, this statistic suggest that the means are highly reliable and that teams can be differentiated in terms of their responses. Table 38 presents both these statistics.

As is evident from table 37., the inter-rater agreement coefficient, $R_{wg(j),}$ for all the variables and constructs in the study is above the acceptable standard of .70 , suggesting that informant ratings within a given team were highly consistent with one another. Evident from table 38. is that ICC(1) values are within the prescribed range. ICC(2) values above 0.50 are generally accepted as valid. With the exception of three levels of diversity, all other ICC(2) values are well within the range. One reason for diversity having low ICC(2) values could be the fact that diversity is present in all the organizations and all the teams. In other words, there is not much difference in perceptions of members on diversity present in their teams. As James (1982) cautions that although ICC(1) and ICC(2) are functionally related, they answer different questions, and their use in aggregation depends upon the subject of interest and nature of data in the study. In this study, the presence of diversity in GVT is highly required, thus having similar responses is considered favorable to the analysis, and only ICC(1) values will suffice for aggregation justification.

Table 38. ICC(1) and ICC(2) Values for Construct and Elements

Construct	Element	ICC(1)	ICC(1)	ICC(2)	ICC(2)
Surface Diversity	Surface Diversity	0.043	0.043	0.140	0.140
Functional Diversity	Functional Diversity	0.157	0.157	0.406	0.406
Deep Diversity	Deep Diversity	0.060	0.060	0.189	0.189
Collaborative Partnership	Mutual Benefits	0.118	0.149	0.635	0.913
	Shared Goals	0.155		0.971	
	Mutual Trust	0.131		0.742	
	Shared Knowledge	0.153		0.949	
Conflict	Conflict	0.035	0.035	0.643	0.643
Task Interdependence	Task Interdependence	0.144	0.144	0.858	0.858
Task Complexity	Task Complexity	0.056	0.108	0.180	0.608
	Task Variability	0.129		0.352	
Collaborative Technology	Collaborative Technology	0.119	0.119	0.331	0.631
GVT Effectiveness	GVT Effectiveness - Performance	0.060	0.073	0.262	0.637
	GVT Effectiveness - Satisfaction	0.060		0.261	

5.8 Team Descriptive Analysis

Based on aggregation justification detailed in the previous section, individual level responses were aggregated to team level by averaging the responses. Table 39. reports the descriptive analysis in terms on mean, standard deviation (S.D) and correlation among various constructs at team level.

Evident from the Table 39. is significant correlation between deep level diversity (-.377, $p<.01$) with collaborative partnership. Functional level diversity and conflict show a positive correlation of .259, which is significant at $p<.05$.

Collaborative partnership depicts a positive significant correlation with GVT effectiveness, with a correlation coefficient of .430 ($p<.01$). Also significant is negative correlation coefficient -.261 ($p<.05$) between conflict and GVT effectiveness.

Descriptive Statistics

Table 39. Descriptive Statistics – Team level

	Mean	S.D	SLD	FLD	DLD	Collaborative Partnership	Conflict	Task Inter-ependence	Task Complexity	Collaborative Technology	GVT Effectiveness
SLD	5.425	0.398	1								
FLD	5.045	0.666	.159	1							
DLD	3.209	0.691	.078	.152	1						
Collaborative Partnership	5.454	0.306	.165	.213	-.377(**)	1					
Conflict	3.381	0.520	.004	.259(*)	.192	-.190	1				
Task Interdependence	5.442	0.361	.109	.053	-.508(**)	.795(**)	-.263(*)	1			
Task Complexity	5.452	0.377	.027	.207	.110	.193	.003	-.086	1		
Collaborative Technology	5.514	0.370	.302(*)	.601(**)	-.046	.631(**)	.118	.277(*)	.445(**)	1	
GVTE Effectiveness	5.091	0.457	.068	.026	-.040	.430(**)	-.261(*)	.407(**)	.026	.271(*)	1

*Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

5.9 Hypotheses Testing

Hierarchical Multiple Regression Analysis (HMRA) was conducted to test the hypotheses (Aiken and West 1991; Cohen et al. 2003).

Hierarchical multiple regression analysis is a method of analyzing the variability of a dependent variable by using information available on a set of independent variables. Hierarchical Multiple Regression involves a series of regressions for each intermediate as well as for the ultimate dependent, where the entry of independents in the regression model is determined by the researcher, based on theoretical arguments.

Hypothesis testing was performed in various stages. In stage 1, H1a-H1c were tested using correlation analysis and significance was assessed by examining the values of F. In step 2, hypotheses H2 and H3 were tested using hierarchical moderated regression analysis approach forwarded by Baron and Kenney (1986). Also similar hypothesis testing was performed. The two hypotheses were tested individually by entering control variables in the equation initially, followed by predictor variables and interaction terms. In step 3, H4 was tested using mediated regression approach (Baron and Kenney 1986).

Since we created a separate construct for conflict, as explained in above sections, all the tests were conducted separately for conflict and collaborative partnership. Thus additional hypotheses were tested for conflict, these were numbered H2A, H3A,, and H4A, they are listed in the following section. Further, measures of surface level diversity and deep level diversity are entered in the regression equations as control variables, and only the measures of deep level diversity are examined in testing hypotheses H2-H5. This

consideration is theoretically sound as the teams are currently operating and team members have, in some instances, spent considerable amount of time interacting with each other. Harrison, Price, Gavin, and Florey (2002) provide support for this argument, "as time spent in collaboration (working together) increases, the negative impact of perceived surface level diversity (both surface level and functional level are treated as one) diminishes and the impact of deep level diversity grows". As members of the team continue to work together, it becomes harder to mask deep-level value differences, and such differences become more salient to the team members. Literature supports the argument that over longer aggregation periods, there is greater portion of the variance in behavior that can be accurately attributed to personality or value differences (Epstein 1980).

Team size and team tenure were used as control variables in our analysis. This is consistent with existing research as it is established that team size has strong implications for team processes and outcomes (Jackson et al. 1991; Harrison et al. 2002). It is important in our study to control for team size because in larger teams it may be harder to develop a collaborative partnership among the team members. Second, team tenure is important to control because the longer the team has been in existence, the longer the members have interacted with each other and had more time to develop harmonious relationships.

In the hypotheses analysis only Deep level diversity items are included since there was no significant relationship between surface level and functional level and collaborative partnership construct. Studies investigating the impacts of diversity of

traditional team development have found surface-level traits to be immediately salient and deep-level traits salient over time (Pelled et al. 1999; Harrison et al. 2002). These researchers concluded that as members of the team continue to work together over time, it may become hard to mask deep level value differences and such differences might become more salient to the team members. The data for teams in this study was collected at a point in time when the team members had already interacted for much time (average team tenure is 9.2 months), and have had formed opinions about others. Thus only deep level traits were more salient in forming of impressions and diversity perceptions. Therefore, subsequent analysis of moderators and mediators, in preceding chapters, focused only on deep level traits of team members.

In the following sections hypotheses are revisited and outcomes are reported.

5.9.1 Hypotheses Revisited

H1. There is a positive relationship between member diversity and development of collaborative partnership in GVT.

H1a. Surface level member diversity will have a positive relationship with development of collaborative partnership in GVT.

H1b. Functional member diversity will have a positive relationship with development of collaborative partnership in GVT.

H1c. Deep-level diversity of global virtual team members will have a positive relationship with development of collaborative partnership.

H2. Collaborative technology will moderate the relationship between diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with highly collaborative technologies than teams with low levels of collaborative technologies.

H3. Task features – interdependence, complexity, and variety will moderate the relationship between GVT diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with high levels of task interdependence, complexity and variety, than teams with low levels task features.

H4. Collaborative Partnership will mediate the relationship between member diversity and global virtual team effectiveness.

H4a. Collaborative Partnership will mediate the relationship between member diversity and global virtual team performance.

H4b. Collaborative Partnership will mediate the relationship between member diversity and global virtual team member satisfaction.

Modifications to Hypotheses

Based on the discussion presented in the previous section certain modifications were made to the hypotheses. H2A, H3A, and H4A were included to test for the moderating effects of conflict and its mediating role. H3 was further separated into H3.1 and H3.1A for task interdependence and task complexity. Thus revised hypotheses are:

H1. There is a positive relationship between member diversity (additive) and development of collaborative partnership in GVT.

H1a. Surface level member diversity will have a positive relationship with development of collaborative partnership in GVT

H1b. Functional member diversity will have a positive relationship with development of collaborative partnership in GVT.

H1c. Deep-level diversity of global virtual team members will have a positive relationship with development of collaborative partnership.

H2. Collaborative technology will moderate the relationship between deep level diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with highly collaborative technologies than teams with low levels of collaborative technologies.

H2A. Collaborative technology will moderate the relationship between deep level diversity and conflict in global virtual teams in that the relationship is stronger for teams with highly collaborative technologies than teams with low levels of collaborative technologies.

H3. Task interdependence will moderate the relationship between GVT deep level diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with high levels of task interdependence than teams with low levels task features.

H3A. Task interdependence will moderate the relationship between GVT deep level diversity and conflict in global virtual teams in that the relationship is stronger for teams with high levels of task interdependence than teams with low levels task features.

H3.1. Task complexity will moderate the relationship between GVT deep level diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with high levels of task complexity than teams with low levels task features.

H3.1A. Task complexity will moderate the relationship between GVT deep level diversity and conflict in global virtual teams in that the relationship is stronger for teams with high levels of task complexity than teams with low levels task features.

H4. Collaborative Partnership will mediate the relationship between member deep level diversity and global virtual team effectiveness.

H4A. Conflict will mediate the relationship between member deep level diversity and global virtual team effectiveness.

5.9.2 Hypotheses 1 a-c

Hypotheses 1 a- c state that different types of diversity will have positive relationships with collaborative partnership in global virtual teams. These hypotheses were tested using the correlation analysis. Further, as the construct conflict is differentiated from other elements of collaborative partnership, the correlation between conflict and different types of diversity was also examined. Table 40. depicts these 6 correlations along with their significance.

Table 40. Correlations

		Surface Level Diversity	Functional level diversity	Deep level diversity	Conflict	Collaborative Partnership
Surface Level Diversity	Pearson Correlation	1				
	Sig. (2-tailed)					
Functional level diversity	Pearson Correlation	.159	1			
	Sig. (2-tailed)	.233				
Deep level diversity	Pearson Correlation	.078	.152	1		
	Sig. (2-tailed)	.559	.253			
Conflict	Pearson Correlation	.004	**.259(*)**	.192	1	
	Sig. (2-tailed)	.979	.049	.148		
Collaborative Partnership	Pearson Correlation	.165	.213	**-.377(**)**	-.190	1
	Sig. (2-tailed)	.215	.101	.004	.153	

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

None of the hypotheses were supported for collaborative partnership and only H1b is supported for the conflict construct. The correlation coefficient between functional level diversity and conflict is 0.259 ($p<.05$). Correlation coefficient between deep level diversity and collaborative partnership is -0.377 ($p<.01$), thus indicating a negative effect.

5.9.3 Moderator Analysis (H2 and H3)

A moderator is a qualitative or quantitative variable that affects the direction and/or strength of the relationship between an independent or predictor variable and a dependent variable (Baron and Kenney, 1986). To understand the moderator effects we can look at Figure 6. The model diagrammed in Figure 6. has three causal paths that feed into the outcome variable: predictor (Path *a) linked with outcome variable,* moderator (Path *b) linked with the outcome,* and the interaction or product of these two (Path *c).* The moderator hypothesis is supported if the interaction (Path *c)* is significant.

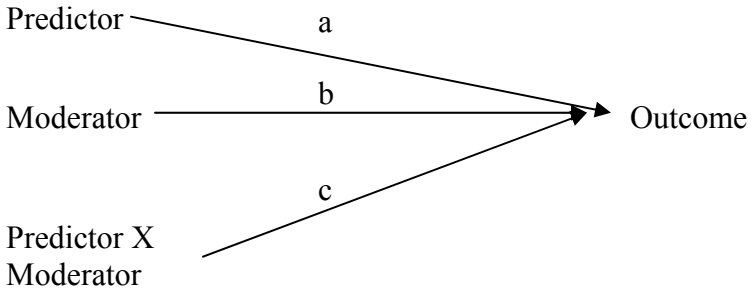

Figure 6. Moderator Analysis

Hypotheses 2 and 3 involve testing for the effects of moderator variables. Baron and Kenney (1986) approach as explained by Frazier, Tix, and Barron (2004) was used by following these steps.

1. Centering and standardizing variables – The variables involved in testing for moderation effects need to centered and standardized (Frazier et al. 2004). Advantages of centering and standardizing variables are listed as reducing the effect of multi-collinearity, easy interpretation, and easy for slope analysis. Thus keeping with approach the three moderator variables, collaborative technology, task interdependence, and task complexity were centered using their means.
2. Creating product terms – After the variables were centered, interaction terms were created by multiplication of predictor variable and moderating variable. Thus three interaction terms were created – Deep level diversity x collaborative technology, deep level diversity x task interdependence, and deep level diversity x task complexity.
3. Structuring the equation – After the variables were centered, interaction terms created, they were entered into the statistical package (SPSS V15) for creating the regression equation. The outcome variable was entered into the model, followed by entering the control variables in step 1, predictor and moderator variables in step 2 – main effects, and entering the interaction terms in step 3.
4. Interpreting the results – To test for the significance of the moderator effect, the single degree freedom F test, representing stepwise change in variance explained as a result of the addition of the product term is looked for significance. Tables

have been provided in their subsections reporting the β, F value, R^2, and △ R^2, are reported for each step.

5. Slope analysis – To further investigate the effects of moderation, simple slope analysis should be conducted following the procedures of Aiken and West (1991). This is conducted by computing the predicted value of outcome variable for representative groups, such as those who score at the mean and 1 standard deviation above and below the mean on the predictor and moderator variables. The computed values are then depicted in a slope graph to understand the effects of the moderator.

5.9.4 Hypotheses 2 and 2A – Collaborative Technology Moderator

Hypothesis 2 states that collaborative technology will moderate the relationship between diversity and collaborative partnership. This hypothesis was tested separately for conflict (H2A) and collaborative partnership (H2). Moderator analysis approach as proposed by Baron and Kenney (1986) and explained above was employed to test this hypothesis.

Table 41. reports the result of regression analysis for both collaborative partnership and conflict as separate dependent variables. In step 1, control variables: team size, team tenure, surface level diversity, and functional level diversity were entered into the regression equation. In step 2, the main effects for deep level diversity and collaborative technology were entered into the regression model and in the last step, the

interaction effect for deep level diversity and collaborative technology was entered into the regression equation.

With collaborative partnership as the dependent variable (Model 1), the regression equation for collaborative technology as moderator showed significant evidence for moderation ($F = 10.06$, $p<0.001$). While with conflict as the dependent variable (Model 2), the regression equation for collaborative technology as moderator showed no significant evidence for moderation.

Simple slope analysis was conducted. Figure 7. depicts the result of the slope analysis. It is quite evident from the graphs that at higher diversity levels, teams with high level of collaborative technology have a higher level of collaborative partnership than teams with low levels of collaborative technology.

Table 41. Moderation Analyses – Collaborative Technology

		Model 1: Regressing **Collaborative Partnership** on Diversity, **Collaborative Technology**		Model 2: Regressing **Conflict** on Diversity, **Collaborative Technology**
Independent Variables		**β**		**β**
Step 1: Control Variables				
Team Size		0.013		-0.018
Team Tenure		-0.001		0.004
Surface Level Diversity		-0.002		-0.049
Functional level Diversity		-0.054		0.161
F(Model)		0.909		1.365
R^2		0.064		0.093
Adjusted R^2		-0.006		0.025
Step 2: Main Effects				
Deep level Diversity		-0.154		0.094
Collaborative Technology		0.695		-0.585
F(Model)		11.95***		1.32
R^2		0.584		0.135
Adjusted R^2		0.536		0.033
$\triangle R^2$		0.520		0.041
Step 3: Interactions				
DLDiversity X Collaborative Technology		-0.021		0.174
F(Model)		10.06***		1.22
R^2		0.585		0.027
Adjusted R^2		0.527		0.146
$\triangle R^2$		0.001		0.012
*** Significant at p<.01				
Only unstandardized coefficients reported				

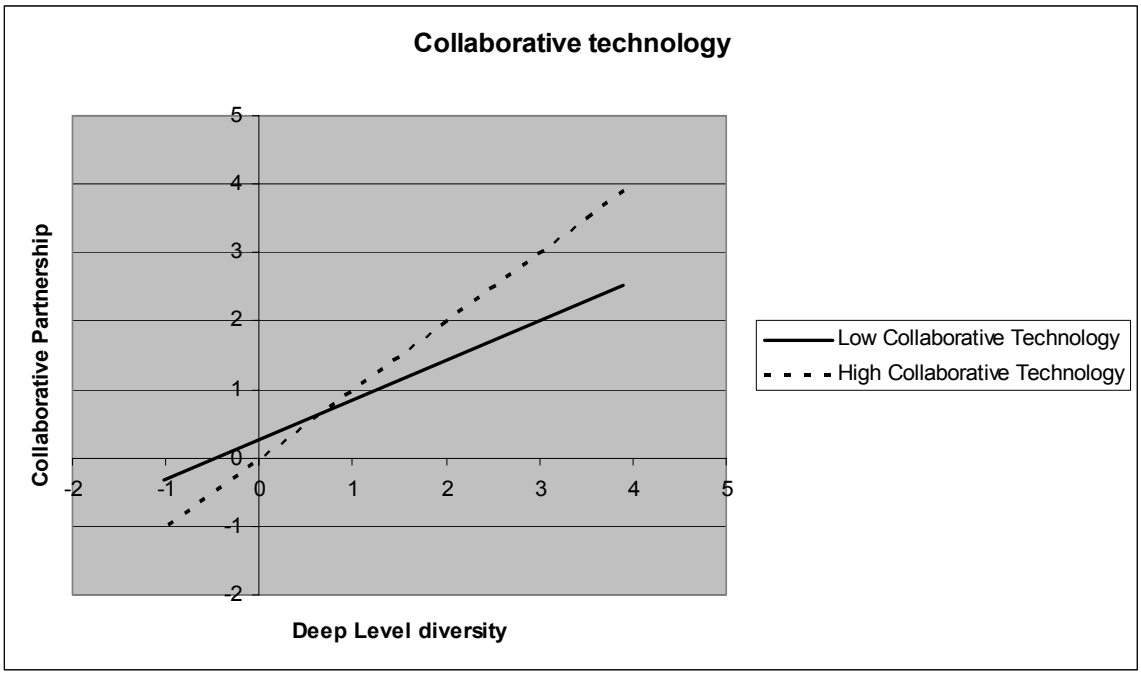

Figure 7. Slope Analyses for Moderator Collaborative Technology

5.9.5 Hypotheses 3and 3A – Task Interdependence Moderator

Hypothesis 3 state that task interdependence will moderate the relationship between diversity and collaborative partnership. Again this hypothesis was tested separately for conflict (H3A) and collaborative partnership (H3). Moderator analysis approach as proposed by Baron and Kenney (1986) and explained above was employed to test this hypothesis.

Table 42. reports the result of regression analysis for both collaborative partnership and conflict as separate dependent variables. In step 1, control variables – team size, team tenure, surface level diversity, and functional level diversity were entered into the regression equation. In step 2, main effects for deep level diversity and task interdependence were entered into the regression model and in the last step, the interaction effect for deep level diversity and task interdependence was entered into the regression equation.

With collaborative partnership as the dependent variable (Model 1), the regression equation for task interdependence as moderator showed significant evidence for moderation ($F = 19.02$, $p<0.001$). While with conflict as the dependent variable (Model 2), the regression equation for task interdependence as moderator showed no significant evidence for moderation.

Simple slope analysis was conducted. Figure 8. depicts the result of the slope analysis. It is evident from the graphs that at higher diversity levels, teams with high task interdependence, have higher level of collaborative partnership than teams with low task interdependence.

Table 42. Moderation Analyses – Task Interdependence

		Model 1: Regressing **Collaborative Partnership** on Diversity, **Task Interdependence**		Model 2: Regressing **Conflict** on Diversity, **Task Interdependence**
Independent Variables		**β**		**β**
Step 1: Control Variables				
Team Size		0.002		-0.013
Team Tenure		0.005		0.001
Surface Level Diversity		0.022		-0.003
Functional level Diversity		0.084		0.156
F(Model)		0.909		1.365
R^2		0.064		0.093
Adjusted R^2		-0.006		0.025
Step 2: Main Effects				
Deep level Diversity		0.008		0.035
Task Interdependence		0.653		-1
F(Model)		16.89***		1.748
R^2		0.665		0.171
Adjusted R^2		0.626		0.073
$\triangle R^2$		0.601		0.077
Step 3: Interactions				
DLDiversity X Task Interdependence		-0.151		0.183
R^2		0.727		0.202
F(Model)		19.02***		1.806
Adjusted R^2		0.689		0.09
$\triangle R^2$		0.062		0.031
*** Significant at p<.01				
Only unstandardized coefficients reported				

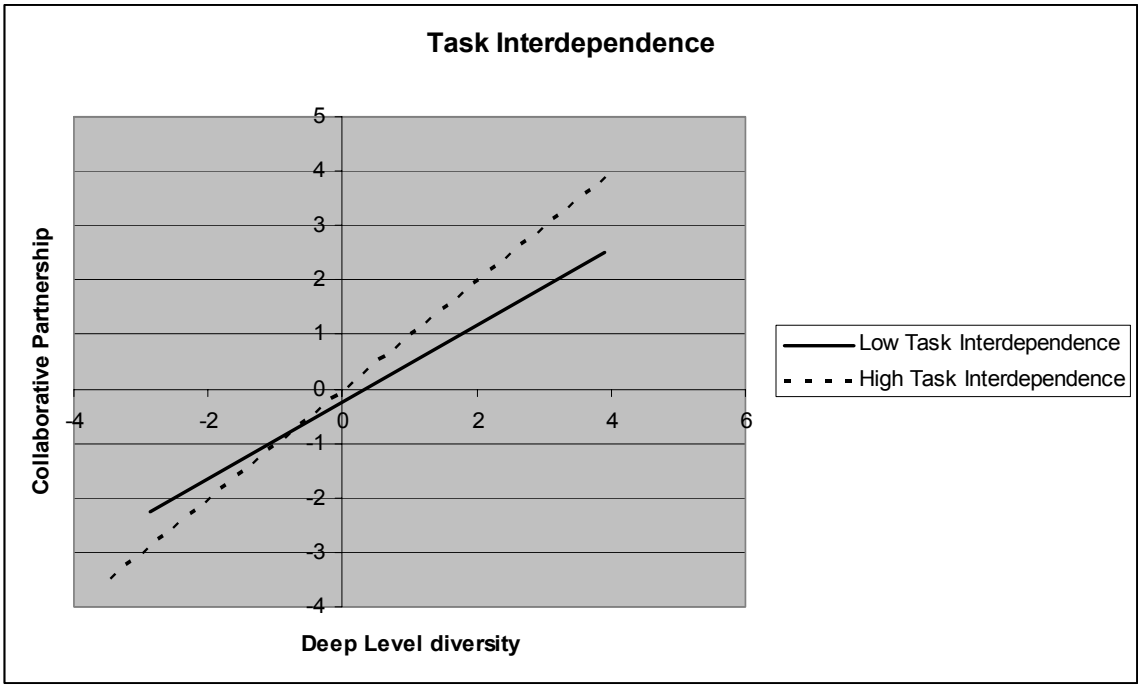

Figure 8. Slope Analyses for Moderator Task Interdependence

5.9.6 Hypotheses 3.1 and 3.1A – Task Complexity Moderator

Hypothesis 3.1 states that task complexity will moderate the relationship between diversity and collaborative partnership. Again this hypothesis was tested separately for conflict (H3.1A) and collaborative partnership (H3.1). Moderator analysis approach as proposed by Baron and Kenney (1986) and explained above was employed to test this hypothesis.

Table 43 reports the result of regression analysis for both collaborative partnership and conflict as separate dependent variables. In step 1, control variables – team size, team tenure, surface level diversity, and functional level diversity were entered into the regression equation. In step 2, main effects for deep level diversity and task complexity were entered into the regression model and in the last step the interaction effect for deep level diversity and task complexity was entered into the regression equation.

With collaborative partnership as the dependent variable (Model 1), the regression equation for task complexity as moderator showed significant evidence for moderation ($F = 3.019$, $p<0.01$). With conflict as the dependent variable (Model 2), the regression equation for task complexity as moderator showed no significant evidence for moderation.

Simple slope analysis was computed. Figure 9. depicts the result of the slope analysis. It is quite evident from the graphs that at higher diversity levels, teams with high level of task complexity lead to a higher level of collaborative partnership than with teams having low levels of task complexity.

Table 43. Moderation Analyses – Task Complexity

		Model 1: Regressing **Collaborative Partnership** on Diversity, **Task Complexity**		Model 2: Regressing **Conflict** on Diversity, **Task Complexity**
Independent Variables		**β**		**β**
Step 1: Control Variables				
Team Size		0.008		-0.017
Team Tenure		-0.003		-0.002
Surface Level Diversity		0.125		-0.036
Functional level Diversity		0.127		0.2
F(Model)		0.909		1.365
R^2		0.064		0.093
Adjusted R^2		-0.006		0.025
Step 2: Main Effects				
Deep level Diversity		-0.211		0.074
Task Complexity		0.17		-1.31
F(Model)		3.59***		1.356
R^2		0.297		0.138
Adjusted R^2		0.214		0.036
$\triangle R^2$		0.233		0.044
Step 3: Interactions				
DLDiversity X Task Complexity		-0.004		0.333
F(Model)		3.019**		1.786
R^2		0.297		0.200
Adjusted R^2		0.199		0.088
$\triangle R^2$		0.000		0.062
*** Significant at p<.01				
** Significant at p<.05				
Only unstandardized coefficients reported				

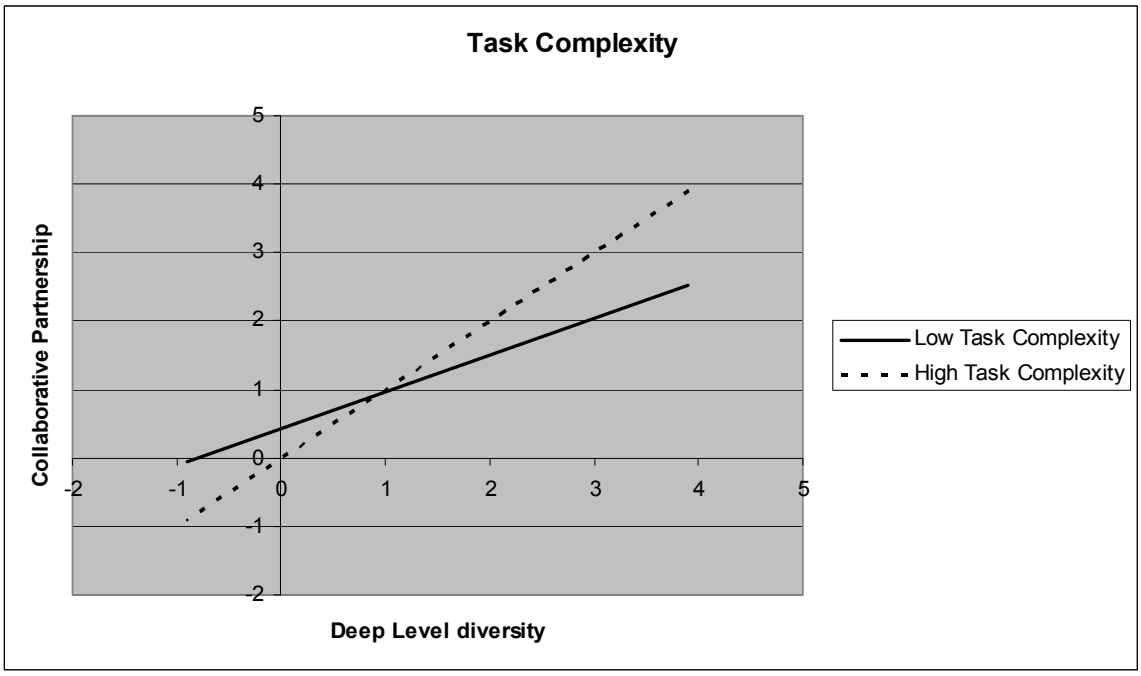

Figure 9. Slope Analyses for Moderator Task Complexity

Thus, all the 3 hypotheses are supported for collaborative partnership construct. They are not supported for the conflict construct.

5.9.7 Mediator Analysis

Since hypothesis 4 involved detecting the effects of mediator for a relationship between independent and dependent variable, we tested the hypotheses using the mediated regression approach as recommended by Baron and Kenney (1986). According to this method, there are four steps (performed with three regression equations) in establishing that a variable mediates the relationship between the predictor and outcome variable. Figure 10 is helpful in understanding this method.

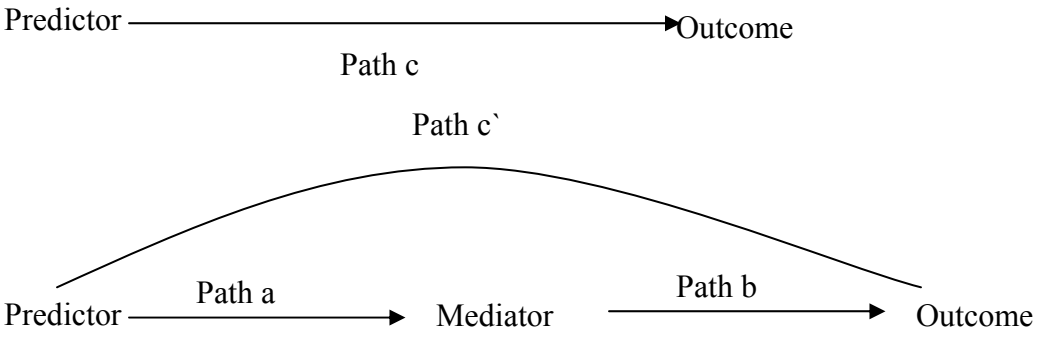

Figure 10. Mediator Analysis

The first step is to show that there is a significant relation between the predictor and the outcome (path c in figure 10.). The second step is to show that the predictor is related to the mediator (path a). The third step is to show that the mediator is related to the outcome variable. This is path b in the diagram, and it is estimated by controlling for the effects of the predictor on the outcome. The final step is to show that the strength of

the relationship between the predictor and outcome is significantly reduced when the mediator is added to the model (comparing path c with path c`). If the variable is a complete mediator between predictor and outcome, then the relation between predictor and outcome will not differ from zero after the mediator is added to the model. In the third equation, the outcome variable is regressed on both the predictor and mediator. This provides a test of whether the mediator is related to the outcome (path b) as well as an estimate of the relationship between the predictor and the outcome controlling for the mediator (path c`).

5.9.8 Hypotheses 4 and 4A

Hypothesis 4 in the study states that collaborative partnership will mediate the relationship between diversity and global virtual team effectiveness. This hypothesis was tested for both collaborative partnership (H4) and conflict (H4A) as mediators. Table 44 reports the results of the HMRA performed to test H4 for collaborative partnership and Table 45 reports the results of mediation analysis performed to test H4A for conflict.

Table 44. Mediation Analyses – Collaborative Partnership

		Path a		Path c		Path b & c'
		Model 1: Regressing Collaborative Partnership on Diversity		Model 2: Regressing GVTE on Diversity		Model 3: Regressing GVTE on Diversity **controlling for Collaborative Partnership**
Independent Variables		**β**		**β**		**β**
Step 1: Control Variables						
Team Size		0.007		0.013		0.007
Team Tenure		-0.004		0.014		0.017
Surface Level Diversity		0.124		0.090		-0.007
Functional level Diversity		0.145		0.021		-0.093
Collaborative Partnership						0.785***
F(Model)		0.909		0.647		3.119**
R^2		0.064		0.047		0.231
Adjusted R^2		-0.006		-0.025		0.157
Step 2: Main Effects						
Deep level Diversity		-0.206		-0.042		0.119
F(Model)		3.68***		0.551*		2.896**
R^2		0.262		0.050		0.254
Adjusted R^2		0.191		-0.041		0.166
$\triangle R^2$		0.198		0.004		0.023
*** Significant at p<.01						
** Significant at p<.05						
* Significant at p<0.1						

Table 45. Mediation Analyses – Conflict

		Model 1: Regressing Conflict on Diversity		Model 2: Regressing GVTE on Diversity		Model 3: Regressing GVTE on Diversity **controlling for Conflict**
		Path a		Path c		Path b & c'
Independent Variables		**β**		**β**		**β**
Step 1: Control Variables						
Team Size		-0.020		0.013		0.009
Team Tenure		0.003		0.014		0.014
Surface Level Diversity		-0.071		0.090		0.074
Functional level Diversity		0.127		0.021		0.051
Conflict						`-0.238*
F(Model)		1.365		0.647		1.339
R^2		0.093		0.047		0.114
Adjusted R^2		0.025		-0.025		0.029
Step 2: Main Effects						
Deep Level Diversity		0.157		-0.042		-0.005
F(Model)		1.599		0.551*		1.095
R^2		0.133		0.050		0.114
Adjusted R^2		0.050		-0.041		0.010
$\triangle R^2$		0.040		0.004		0.000
*** Significant at p<.01						
** Significant at p<.05						
* Significant at p<0.1						

Table 44. depicts the results of HMRA for collaborative partnership as mediator between diversity and global virtual team effectiveness. Existing literature on mediation and moderation analysis suggest that if there are a number of possible moderators (interactions), then two approaches are possible. First, one could add interactions one at a time and separately test for their significance. On the other hand, if we return to the simple until proven otherwise position, then some of the interactions may appear to be significant due to chance (e.g., 1 out of 20 at the .05 level). Therefore, a more conservative procedure is to test for the improvement due to the inclusion of the set of interactions as a group (i.e., in a nested model F test) and test the significance of the F. (Baron and Kenney 1986)

For collaborative partnership mediation, F test is conducted for 3 models. Model 1 measures the effects of relation between predictor and mediator (path a). In our case, collaborative partnership is regressed on control variables and deep level diversity. In model 2, outcome variable is regressed on predictor variable (path c); in this study GVT effectiveness is the outcome variable and control variables are entered in step 1, deep level diversity in step 2. Model 3, displays the result of regression equation, where outcome variable is regressed on predictor variable controlling for mediating variable (Path b & c'); in our case collaborative partnership is added as a control variable in the equation.

The first step involved in testing for mediation is testing for significance of path c. In model 2 of table 44. the F of overall model 0.551 is significant ($p<0.1$). Thus step 1 of mediator analysis is established. Second, significance of predictor –mediator relationship

is to be established (path a). Model 1 in Table 44. has overall F of 3.68 significant at p<.01 level. Thus step 2 is met. In model 3 of table 44 we test for two effects, path b and path c in the same equation. In Model 3, F of step 1 model is 3.119 significant at p<.05 level which establishes the significance of path b. Also coefficient of mediator variable, collaborative partnership, is positive 0.785 and significant at p<.01. Further significance of path c' is established by looking at overall F of the model, which is 2.896 significant at p<.05 level. Thus we can say that mediation is supported in our model partially.

Also a careful analysis of various coefficients clearly depicts the changes in the explanation power of the model by including the mediating term. The coefficient of deep level diversity increased from -0.042 to 0.119, depicting the positive effects of developing collaborative partnership in diverse global virtual teams. Also the explaining power of the model increased from 5% to 25%.

For assessing the mediation effects of conflict, we look at HMRA output presented in Table 45.. The first step involved in testing for mediation is testing for significance of path c. In model 2 of table 45. the F of overall model 0.551 is significant (p<0.1). Thus step 1 of mediator analysis is established. Second, significance of predictor –mediator relationship is to be established (path a). Model 1 in Table 45. has overall F of 1.599 which is not supported at p = .177. Though statistically mediation is not supported at all, but looking at Model 3, where overall F is 1.095, with p = .378, our hypothesis for mediation of conflict is not supported at all.

5.10 Summary of Results

Table 46. Hypotheses Results Summary

#	Hypothesis	Supported
H1	*There is a positive relationship between member diversity and development of collaborative partnership in GVT.*	
H1a	*Surface level member diversity will have a positive relationship with development of collaborative partnership in GVT.*	No
H1b	*Functional member diversity will have a positive relationship with development of collaborative partnership in GVT.*	No
H1c	*Deep-level diversity of global virtual team members will have a positive relationship with development of collaborative partnership.*	No
H2	*Collaborative technology will moderate the relationship between diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with highly collaborative technologies than teams with low levels of collaborative technologies.*	Yes
H2A	*Collaborative technology will moderate the relationship between diversity and conflict in global virtual teams in that the relationship is stronger for teams with highly collaborative technologies than teams with low levels of collaborative technologies.*	No
H3	*Task interdependence will moderate the relationship between GVT diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with high levels of task interdependence than teams with low levels of task features.*	Yes
H3A	*Task interdependence will moderate the relationship between GVT diversity and conflict in global virtual teams in that the relationship is stronger for teams with high levels of task interdependence than teams with low levels task features.*	No
H3.1	*Task complexity will moderate the relationship between GVT diversity and collaborative partnership in global virtual teams in that the relationship is stronger for teams with high levels of task complexity than teams with low levels task features.*	Yes
H3.1A	*Task complexity will moderate the relationship between GVT diversity and conflict in global virtual teams in that the relationship is stronger for teams with high levels of task complexity than teams with low levels task features.*	No
H4	*Collaborative Partnership will mediate the relationship between member diversity and global virtual team effectiveness.*	Yes
H4A	*Conflict will mediate the relationship between member diversity and global virtual team effectiveness.*	No

CHAPTER VI

DISCUSSION

6.1 Introduction

This chapter draws together results from the previous chapter. The data analysis chapter presented findings relating to the validity of various scales and the results of the hypotheses testing. In this chapter, the results will be interpreted and conclusions about what has been learned will be presented.

This research study continues an emerging trend in diversity research. It extends the research on team member diversity to new organizational forms of global virtual teams. Due to geographical dispersion and high use of information technology in virtual settings, transfer of knowledge is made more difficult in virtual teams. These teams are characterized by geographical dispersion, use of IT for communication, members having little history, members having organizational and cultural heterogeneity and members having lateral and weak relationships (Wong and Burton 2000). Thus, the study of these results provides a useful understanding of (1) defining and establishing a unified construct of collaborative partnership for relationship building in GVT, (2) separately assessing the impacts of three levels of diversity (H1a – H1c), (3) proposing and testing

the moderating role of collaborative technology and task features (task interdependence and task complexity) on the relationship between member diversity and collaborative partnership (H2, H3, & H3.1), and (4) specifying and testing the presumed but unexamined mediating role of collaborative partnership in influencing GVT effectiveness in teams with diverse members (H4). Furthermore, the study builds upon the existing I-P-O framework of team research and builds a theoretical model toward understanding GVT effectiveness through member relationship building.

The following subsections of the chapter build upon the results of data analysis and provide insights into the relevance of the results. Sections are also included to highlight the practical and research implications from the findings of the study.

6.2 Collaborative Partnership as a Unified Construct

One of the underlying premises of the study was to understand the combined effects of elements of collaborative partnership on global virtual team effectiveness. It was hypothesized that collaborative partnership, as an overall construct comprising of mutual benefits, shared goals, mutual trust, shared knowledge and conflict would mediate the relationship between member diversity and GVT effectiveness. Collaborative partnership was assumed to be a unified construct. It was found that except conflict, all other elements of collaborative partnership work in harmony towards GVT effectiveness. This mediating and positive effect is explored further in one of the subsections of this chapter.

Collaborative partnership was defined as "a relationship between individuals or groups that is characterized by mutual cooperation and responsibility, for the achievement of a specified goal." Researchers have focused on limited elements of collaborative partnership and that too in isolation, from other elements. Their efforts focus on explaining specific elements of team effectiveness.

The approach taken under this study was to view collaborative partnership as a unified construct and an attempt was made to understand its effect on GVT effectiveness. Collaborative partnership provides the power to transform ordinary learning experiences into dynamic relationships, resulting in a synergistic process of accomplishment. There are a many references in the literature that address specific elements of collaborative partnerships and their relationship with team effectiveness. However, there is not a consensus regarding definitions of different concepts underlying these elements. This situation contributes to a certain degree of confusion in discussions and sometimes creates the illusion of equivalence or difference when things are not quite that way. Thus, the contribution of various elements of collaborative partnership towards GVT effectiveness is presented through varied interpretations and definitions of similar underlying elements. The analysis from this research study clearly pointed out the unidimensionality of various elements and depicted their combined effect.

The exploratory factor analysis conducted on twenty three items pertaining to various elements of collaborative partnership clearly demonstrated two latent components. One component had high factor loadings for mutual benefits, shared goals, mutual trust and shared knowledge and other component was only comprised of conflict.

Also a negative correlation coefficient (-.190) between four elements of collaborative partnership and conflict confirmed the natural reverse effects of conflict.

This behavior of conflict is consistent with existing literature on conflict as established in research on work groups and teams. In a study on team conflict, De Dreu and Van Vianen (2001) examined the associations found in empirical research between task and relationship conflict and team outcomes (team performance and team members' satisfaction). Concerning the effects of intra-group conflict on task performance, the results showed that both task and relationship conflict are equally disruptive. In fact, even when the authors investigated possible moderators of the relationship between intra-group conflict and team performance, they found no single positive correlation. In regards to team members' satisfaction, De Dreu and Van Vianen (2001) results showed that relationship conflict is more dysfunctional than task conflict. The authors concluded that there are no differential associations between task and relationship conflict and their impact on team performance.

6.3 Levels of Diversity and Their Impacts

The type of diversity within global virtual teams is an important characteristic that shapes team processes and affects the performance and experiences of individuals within the team (Carte and Chidambaram 2004). The purpose of this study was to explore the impact of surface level, functional level, and deep level of diversity on collaborative partnership. Hypotheses 1a, 1b, and 1c were tested to assess the impacts of these various types of diversity on collaborative partnership. The objective was to suggest that different

conceptualizations of diversity have different implications for team processes and relationship building among individual team members.

Existing management literature on teams and diversity inherent in teams has primarily considered the impact of visible or surface level diversity on team performance (Milliken and Martins 1996; Williams and O'Reilly 1998). Further, these studies are focused on face-to-face teams or teams where the members meet with each other and form diversity perceptions based on visible demographic of the team members. Other researchers in management literature have focused on other visible aspects of team members such as functional diversity (Michel and Hambrick 1992; Bunderson and Sutcliffe 2002). In parallel, researchers in psychology domain have focused their efforts on deep-level diversity and its impact on team processes and performance (Neuman and Wright 1999). A few studies have attempted to dwell deeper into the diversity black box and examined simultaneously different types of diversity that characterize teams (Jehn et al. 199l; Harrison et al. 2002). This study falls under this domain and takes into consideration three dominant types of diversity.

Though not explicitly hypothesized, the results of exploratory factor analysis on the diversity scale, distinctly revealed three different types of diversity present in global virtual teams. The items of these three types of diversity loaded on three distinct components. Further, item-to-total correlations, for both constructs and elements, depicted clear distinction between the three levels of diversity.

Hypotheses 1 (a- c) state that different types of diversity will have positive relationships with collaborative partnership in global virtual teams. These hypotheses

were tested using the correlation analysis. Further, as the construct conflict is differentiated from other elements of collaborative partnership the correlation between conflict and different types of diversity was also examined. The results failed to provide a significant positive relation between surface level, functional level, and deep level diversity and collaborative partnership. Surface level and functional level have a positive relation with collaborative partnership but the coefficient was not significant. Deep level diversity has a negative relationship. Only functional level diversity had a significant positive association with conflict.

Explanation of these contrary to expectation results can be provided in the very basic fact that the study was focused on global virtual teams. GVTs depart from traditional teams in two significant aspects. One being the use of technology for communication and operation with lack of face-to-face interaction, and second being more cultural, functional and cognitive diversity.

6.3.1 Effect of Surface Level Diversity

The use of technological media for communication hides or makes invisible the surface level diversity traits. For example, if members of a team are using a groupware technology for interaction – age, sex, and ethnicity are invisible or are hidden beyond the username aspects of the technology. In absence of such visible surface level traits, members form their opinions and build relationships based on deeper psychological or cognitive traits and functional level traits such as member expertise. Thus, members in a

global virtual team, in absence of visible traits, may reach conclusions about similarity and participant categorization based upon non-visible traits.

6.3.2 Effect of Functional Level Diversity

The non significant correlation coefficient between functional level diversity and collaborative partnership could be attributed to the team formation process. One of the strategic reasons for forming virtual teams is to combine core competencies of specialists from different locations and the main selection criteria for virtual team members are their professional/technical KSAs (knowledge, skills, abilities) and expertise (Hertel et al. 2005). If the team members are carefully selected, effects of functional diversity would not be visible or perceived over a period of time. GVTs in this study have an average tenure of 9.2 months, suggesting that most of these GVTs could have been working together for long time and functional diversity perceptions could have been diminished.

6.3.3 Effect of Deep Level Diversity

Studies investigating the impacts of diversity of traditional team development have found surface-level traits to be immediately salient and deep-level traits salient over time (Pelled et al. 1999; Harrison et al. 2002). These researchers concluded that as members of the team continue to work together over time, it may become hard to mask deep level value differences and such differences might become more salient to the team members. The data for teams in this study was collected at a point in time when the team members had already interacted for much time (average team tenure is 9.2 months), and

have had formed opinions about others. Thus only deep level traits were more salient in forming of impressions and diversity perceptions. Therefore, subsequent analysis of moderators and mediators, in preceding chapters, focused only on deep level traits of team members.

6.3.4 Effect of Functional Diversity and Conflict

The significant positive association of functional level diversity with conflict is an interesting finding from the study. These findings are consistent with a study by Pelled, Eisenhardt, and Xin (1999), which found functional background diversity to have a positive relationship with conflict. When team members come from different functional areas, they are likely to share diverse perspectives over the tasks to be performed and stimulate more task-oriented debates.

The non significant relationship between surface level diversity and conflict could be attributed to the fact that teams had been in existence for some time and surface level differences may have been overcome. The insignificant relationship between deep level diversity and conflict indicates that conflict is more cognitive and members do not indulge in affective and emotional arguments. Thus, it brings forth the assumption that conflict is more task oriented in global virtual teams.

The results of this research have important implications for the way scholars and practitioners think about the benefits and challenges of diversity in global virtual teams. Specifically, the results underscore the need to move beyond the simple 'heterogeneity-affects-performance' model and look at the multifaceted diversity in different way. The

absence of significant surface level and functional level diversity in global virtual teams calls for more attention by GVT developers and creators to focus on deep level diversity.

6.4 Moderating Role of Collaborative Technology and Task Features

Moderators are defined as factors or variables that affect the strength of the relationship between two other variables or that can account for observed variation in a relationship (Baron and Kenney 1986). The lack of significant positive diversity effects on collaborative partnership supports the conclusions of some of the existing diversity in traditional team research (Williams and O'Reilly 1998) and calls for increased attention to be given to role of moderators.

In this research study, two potential moderators of this relationship between deep level diversity and collaborative partnership were examined. The two moderators are collaborative technology and task features, with task features further analyzed for task interdependence and task complexity.

Hypotheses 2, 3, and 3.1 deal with assessing and examining the effects these three moderators, technology, task interdependence, and task complexity, have on the relationship between deep level diversity and collaborative partnership, respectively. Further, as conflict was treated as a separate construct, moderators' effect on conflict was also examined. The three hypotheses for the three moderators were statistically significant for collaborative partnership, which is consistent with literature on traditional teams (Campion et al. 1993), but were not significant for conflict.

Consistent with previous research on traditional teams, we confirmed that task interdependence plays a significant moderating role in global virtual team environment relation building (Stewart and Barrick 2000). In global virtual teams, which depict high diversity in deep level attitudes and values, having a task which is inherently interdependent, will lead to high collaborative partnership. Highly task interdependent virtual teams use the collective knowledge and skills of the members to get the work done. The demands of the high interdependent task motivate the GVT members to develop higher interpersonal interactions. These teams exhibit higher levels of social processes, extensive mutual learning, and a sense of collective responsibility for performance (Wageman 1995). As pointed out by Kozlowski, Gully, Nason, and Smith (1999), task interdependence becomes an integral aspect of the multi-level approach, because it transforms a collective of individuals into a team that transcends the sum of its individual members. In GVTs with members having different attitudes, values, personality traits, members would develop constructive ways to survive the high demands from task interdependence, and thereby would try and minimize their differences towards a common reward system.

High task complexity also exhibits similar behavior, as task interdependence. Complexity of the task would motivate the individual members to develop higher levels of interpersonal interactions. Results from this study bring to light the fact that groups with high levels of task complexity and high degree of deep level differences depict higher levels of collaborative partnership.

These findings have significant implications for managers and leaders of global virtual teams. It should be highlighted that, if the managers are integrating members from different cultural backgrounds with varied attitudinal and cognitive traits; such members would be able to develop high levels of interpersonal relationships with high levels task interdependence and task complexity. In other words, the relationship between collaborative partnership and diversity will be strengthened, if the task entrusted to the team members is interdependent and complex. Findings further imply that global virtual teams are not suited to projects or tasks which are not complex or do not ensure interdependence among members. Simpler means of communication may be more apt for such purposes.

The other moderator which was examined in one of the hypotheses was collaborative technology. From the data it was evident that most of the teams used emails as the preferred set of medium for communication. Almost 67% of the respondents stated that they used emails daily. Groupware was another medium which was used more often than other mediums. 75% of respondents used groupware technologies at-least once a week. Carte and Chidambaram (2004) stated that in later stages of teamwork, additive capabilities of technology in terms of coordination support, electronic trail, and enhanced capabilities have a high impact and facilitate rich communication. Caouette & O'Connor (1998) found that collaborative technologies can neutralize the negative impact of group demography and improve cohesion by ensuring that surface-level diversity, the key catalyst in the appearance of subgroups, is not easily perceptible. Also, Walther (1992) found that the repeated electronic interactions (i.e., the accumulation of messages and

opinions) among the members gradually reveal group feelings and attitudes leading to an increased sense of belonging.

Results from this study indicate acceptance of collaborative technology as a significant moderator of relationship between deep level differences and development of collaborative partnership. Slope analysis revealed that for teams with high differences and availability of technology depicting high - parallelism, transparency, and sociality – levels of collaborative partnership were high.

The virtual dimension of global virtual teams involves dealing with constraints uniquely associated with using electronic technologies for communication and interaction and accomplishing the required task. In using technology to communicate via a distance, team members must have an adequate knowledge of the technology and its uses to enhance and maintain communication. Results from this study support some of the conclusions found in existing literature. Driskell, Radtke, and Salas (2003) noted that the loss of expressive contextual information leads to weaker interpersonal bonds. Their focus was on understanding the capability of ICT from a media richness perspective. Many of the constructs of MRT, i.e., parallelism, transparency, and sociality were utilized in our study thus validating the past studies.

These findings have strong implications for decision makers in deciding the appropriate form and type of technology to be adopted for diverse global team communications. If the technology does not permit rich communication and does not allow a way to maintain and initiate social relationships, then the members of the virtual

team would not be given enough opportunity to align and harmonize their individual differences.

The significant moderator findings for task interdependence, task complexity, and collaborative technology, have theoretical implications for researchers in the area of GVT relationship building. This study confirms conclusions from existing research that task features and technology may be moderators of design-outcome relationships (Fry and Slocum 1984; Gladstein 1984; Campion et al. 1993). The results therefore refine the affirmation made by Straus and McGrath (1994) that the effectiveness of a VT depends to a great extent on the match between the task demands and the communication technology used by the team. This reflection would provide support for the findings of other field studies (Maznewski and Chudoba 2000), where it has been concluded that the performance of more complex tasks at higher levels of interdependence is associated with the use of synchronous communication tools permitting more frequent communication and intricate decision-making processes.

6.5 Mediating Role of Collaborative Partnership

One of the major objectives of this study was to demonstrate whether diversity has association with collaborative partnership and how collaborative partnership mediates the relationship between diversity and global virtual team effectiveness. Also, conflict being an individual construct in itself, the study examined the mediating role of conflict between diversity and GVT effectiveness.

Results from this study confirmed the hypotheses that in global virtual teams which depict high level of diversity, team effectiveness and member satisfaction can be

achieved through developing collaborative partnership among diverse members, implying mediating role of collaborative partnership.

Table 39, which presents the descriptive statistics of various constructs in this study, shows a negative association (-.04) between deep level diversity and GVT effectiveness. Also Table 43, which reports the result of hierarchical regression analysis for testing the mediating role of collaborative partnership, shows a coefficient of -0.042 when GVT effectiveness is regressed on control variables first and then deep level diversity (Model 2) ($F = 0.551$, $p<0.1$). In Model 3 of the same table, when collaborative partnership is introduced as a control variable, the diversity coefficient changes to .119. Also R-square of this model is 0.254 ($F= 2.896$, $p<.05$). It is evident that collaborative partnership contributes positively to the negative association between diversity and GVT effectiveness.

Looking at the construct conflict, which was factored out of overall collaborative partnership, Table 39, descriptive statistics reports a negative association between conflict and GVT effectiveness with coefficient being -.261 ($p<.05$). HRM analysis for analyzing mediating effects of conflict was not supported. But what was interesting to note was the association between diversity and conflict (correlation coefficient = .192), signifying a positive association between conflict and diversity. Also worth mentioning is the negative significant coefficient of conflict (-0.238, $p<0.1$) in Model 3 of Table 44. Though the mediating effects were not supported, a negative relationship between GVT effectiveness and conflict has important implications. These findings confirm with the existing literature where researchers have concluded that conflict is negatively associated

with team performance (Jhen et al. 2001; Dreu and Weingart 2003; Kankanhalli et al. 2006).

Dickson and DeSanctis (2001) describe collaborative effort in teamwork in their model of value creation. Collaboration is one of the components in the value creation. It deals with the degree people in the organization combine their emotional efforts to achieve common goals. Our results confirm the claims made by past researchers that to be effective and efficient, teams need more than a mix or structure. You cannot just make a mix of people and expect high performance from this bunch. According to Katzenbach and Smith (1993), within teams, there is nothing more important than each team member's commitment to a common purpose and a set of linked performance goals for which the group holds itself jointly accountable. Teamwork represents a set of values that encourage behaviors such as listening and constructively responding to ideas expressed by other people. These values also encourage in giving others the benefit of the doubt, providing support to those who need it, recognizing the interests and appreciating achievements of others. Katzenbach and Smith (1993) claim that values of this kind increase both the individuals' and the team's level of performance which then increase the quality of work in the organization.

The findings from this study help to understand and better explain how teams with high levels of diversity can be promoted to perform at par with less heterogeneous global virtual teams or collocated teams. In this study, collaborative partnership mediates the relationship between diversity and GVT effectiveness. This means that one of the ways, performance can be achieved is through creating an environment of collaboration

in terms of mutual benefits, shared goals, mutual trust and shared knowledge among the team members. Findings also support and contribute empirically to the some of the claims that, under the right conditions, diversity can be a key activator of collaborative partnership and thereby promote overall team effectiveness. When executed effectively, collaborative partnership enables an energetic workplace for the global team members where teamwork is enhanced through the creation and implementation of a diverse collection of ideas, personalities, and resources.

The results also have practical implications for managers and team leaders of global virtual teams. The mediating role of collaborative partnership points to the design and focus on training for team members. To eliminate the negative effects of diversity team decision makers need to create and facilitate partnership building among the members, and orient team communication in the direction of maintaining such cognitive relationships.

6.6 Revised Operational Model

The proposed global virtual team effectiveness model presented in Figure 11. needs to be revised to incorporate what has been learned through this research. Figure 11. presents the revised research model. The simple input-process-output model was supported from the results. Also there was support for moderating factors – task interdependence, task complexity and collaborative technology. GVT effectiveness is a uni-dimensional construct encompassing both GVT performance and member satisfaction. Conflict needs to be treated separately and its effects need to be analyzed

seperately and not with other elements of collaborative partnership. Diversity levels – surface and functional – have limited effect on partnerships and effectiveness in virtual environments; more prominent are the deep level effects.

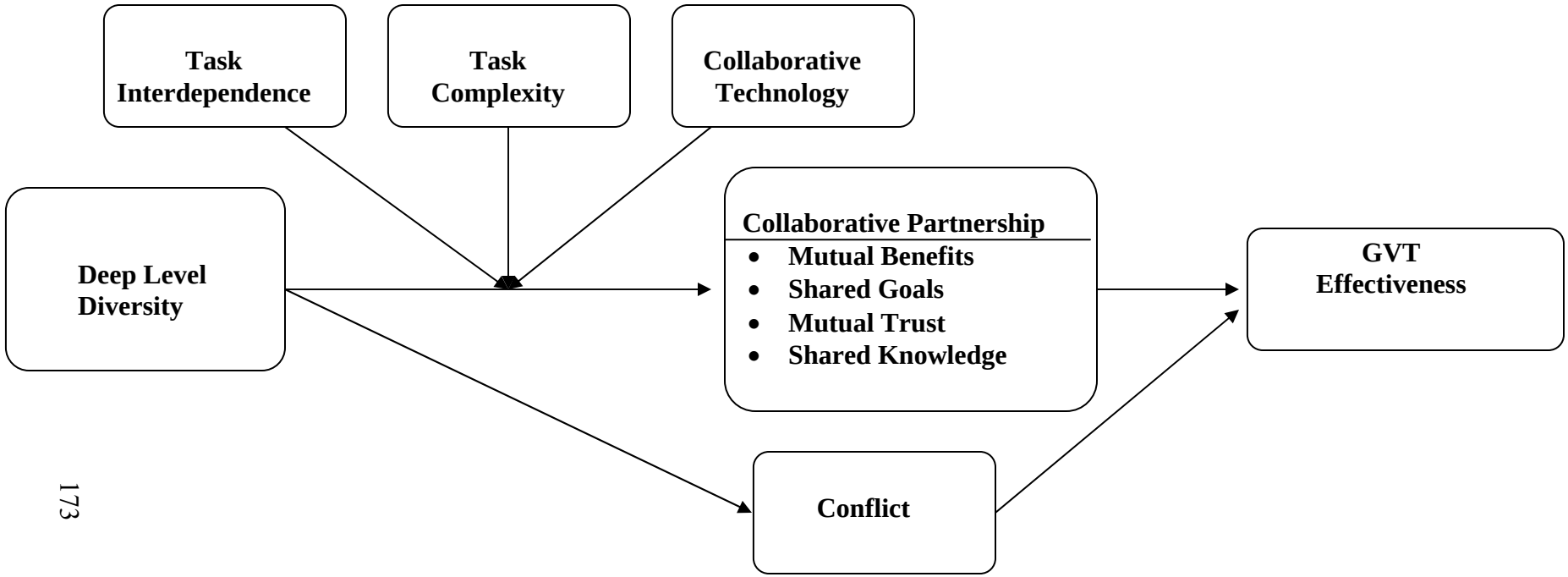

Figure 11. Revised Conceptual Research Model

Teamwork in the global workplace is challenging. Many managers have an ongoing struggle to build commitment to common goals, align and enforce performance expectations, build mutual trust, motivate members to share knowledge and navigate personality issues. As it was pointed out earlier there are three areas that must be considered when designing a collaborative global virtual team environment: people, process, and technology. We must be able to adapt to different work styles and cultures, leverage harmonious team processes, and utilize appropriate technologies to create efficiencies in the global workplace.

The findings from this study are first step in such directions. The novelty of the collaborative partnership concept, the focus on collaborative technology, an examination of task dimensions, and looking for right diversity mix are some of the concepts this study offers.

6.7 Practical Implications

In addition to theoretical and methodological contributions, this research has contributed in a practical way to a deeper understanding of global virtual team's effectiveness in relation to diversity of team members and elements of collaborative technology. The revised model elucidates the specific partnership elements that are instrumental in constructing and maintaining effective global virtual teams. The articulation of these elements and their implications provides a means through which

diverse teams can be made productive and provide necessary elements for fostering and building harmonious relationships within team members.

Specifically, the findings of this research help managers and developers of global virtual teams in following manner:

1. Focus on the mix of diversity by analyzing and examining the various levels of diversity. In global virtual environments, surface level traits are practically non existent as identities are hidden behind the walls of technology. More prominent are the functional level and deep level cognitive traits. Also, functional level traits are salient over time. Based on the findings of this study and confirming the results of other studies, it is recommended to complement more functional and deep level traits, rather than surface level traits. The positive relationship between functional level and collaborative partnership calls for increase in such diversity mix, where as the negative relation between deep level and collaborative partnership would warrant reduction in such differences.

2. The concept of collaborative partnership and its mediating role between diversity and GVT effectiveness helps managers in harnessing the positive effects of diversity. If the managers and team leaders are faced with a team which depicts high level of diversity, creating a partnership environment can help such mangers to effectively manage such teams. Training sessions for members and team leaders can be aligned to focus on various elements of partnership construct.

3. The scale developed in this study can be used by managers and leaders of the team and stakeholders external to the team to assess the team members' relationships. The validated scale for measuring different constructs could serve as a tool for measuring team members perceptions on elements of collaborative partnership, diversity, collaborative technology, features of task, and effectiveness.

4. The unified construct of collaborative partnership brings forth the understanding that it is not one element of relationship building that is important, rather it is a complete construct comprising of – mutual trust, shared benefits, mutual trust, and shared knowledge – which should be focused. Training for members needs to focus on all aspects and not just one element in isolation.

5. Findings also suggest the appropriate technology characteristics that should be present to facilitate collaborative environments. Managers and leaders when deciding on appropriate technology for team communication should select a technology that promotes parallelism, transparency, and sociality. Similarly, designers of communication technology should benefit from the results of this study and aim to incorporate such features in existing or developing technology.

6. Findings support the claim that the tasks of global virtual team be interdependent and complex. Decision makers, entrusted with the responsibility of selecting and implementing GVT in their organizations, can benefit in task selection. Specifically, GVT should be implemented for highly interdependent and complex tasks. Such characteristics of task will motivate members to interact interpersonally and lead to better relationship building among team members.

6.8 Research Contributions

The objective of this research was to contribute to the theory on diversity in global virtual teams and to some degree traditional teams, by identifying collaborative partnership and its mediating role in GVT effectiveness. Furthermore, the study also demonstrated the moderating role of collaborative technology and task features.

Diversity Research

Research and findings for diversity within teams have been divided into two camps, optimistic and pessimistic (Mannix and Neale 2005). The optimistic view focuses on diverse teams' access to variety of resources and increased creativity, innovation, and performance based on underpinnings of cognitive resource diversity theory (Cox and Blake 1991). The pessimistic camp, concentrates on affective problems, as predicted by similarity attraction paradigm and social categorization theories (Pfeffer 1983; O'Reilly et al. 1989). Findings from this study support the optimistic camp and support the claims that greater diversity entails relationships among people with different sets of contacts, skills, information, and experiences.

Literature also points that clarifying the mixed effects of diversity in work groups will only be possible by carefully considering moderators, by broadening our view to include types of diversity, and by focusing more carefully on mediating mechanisms (Mannix and Neale 2005). This research study provided answers to such calls by opening the black box of diversity and examining surface level, functional level, and deep level diversity. Moderator effects of task interdependence, task complexity, and collaborative technology are analyzed and mediating role of collaborative partnership is established. Findings from this study extend the diversity research to new organizational forms i.e., global virtual teams, which face an increased challenge in diversity management.

Collaborative Partnership

The mediating role of collaborative partnership, which is defined, based on its individual elements – mutual benefits, shared knowledge, shared goals, and mutual trust, extends current research in two directions. First, collaborative partnership is viewed as a unified construct comprising of different elements. The results indicate unidimensionality of the various elements of collaborative partnership, which existing literature have treated individually. These elements exemplify collaborative learning; team members who are partners support each other and are not just invested in the outcome of the task. Partnership empowers the members to achieve more than they set out to do as individuals, thus creating synergies towards effectiveness (Handerson 1990). Thus, in research studies where the object of analysis is relationship building, considering collaborative partnership as a unified construct will yield more significant insights.

Second, the importance of establishing member partnerships for advancing collaborative environments in diverse teams represents an initial step toward establishing a strategy for virtual collaboration and teamwork. In existing research, the majority of effects of diversity on team performance (both positive and negative) have typically been explained by their effects on potential mediators such as social integration, communication, and conflict (Mannix and Neale 2005) Findings from this study support this claim and extend a unified view of mediators.

Normative Framework

The objective of the research was to aim at developing and empirically testing a comprehensive model for GVT effectiveness based on understanding the mediating role of collaborative partnership between diverse team members and GVT effectiveness. Further, the research aims towards understanding the moderating role of collaborative technology and task on the relationship between diverse team members and collaborative partnership. Support from empirical evidence validated the proposed framework, which provides numerous opportunities to future researchers. Despite the current increase in the popularity of research on GVT and diversity in teams, few studies have provided a holistic view and empirically validated proposed models (Powell et al. 2004). The development of the conceptual research model for explaining and predicting GVT effectiveness in diverse teams and its empirical evidence extends current research and fills the gap existing in the literature.

Methodological Contributions

Research contribution is derived from the methodology employed in this study. First, beyond what has been done in prior research, which was generally based on the study of student projects, controlled experiments, or selected cases of GVT (Martins et al. 2004), this study focuses on business organizations in which GVTs operate. The findings from the study are more generalizable and depict high external validity as data was collected from a substantial sample of GVTs in real organizations. Second, the validated measurement scales employed in this study provide opportunity to future researchers working in this area.

CHAPTER VII

CONCLUSION

7.1 Introduction

The purpose of this research was to understand the different facets of diversity present in global virtual teams and how these differences among individual members can be harnessed, by developing a collaborative partnership environment and in turn lead to greater GVT effectiveness. Furthermore, in building the relationship between collaborative partnership and diversity, this research demonstrated the moderation effects of collaborative technology, task complexity, and task interdependence. In the line of arguments among existing research on diversity in teams which poses both opportunities and threats, this research took the positive opportunity perspective. The research explored the mediating effects of collaborative partnership in mitigating the negative effects of diversity present within the global virtual team.

This chapter provides a summary of all the preceding chapters and points to certain limitations of the present study and why caution should be administered in interpreting the results of this study. The chapter closes with some suggestions for future research work and extending the current line of work beyond what has been established.

7.2 Summary

The first chapter sets the scope and motivation for this research. It provides a brief introduction and a few statistics on the use of teams and global virtual teams in organizations. It is also pointed that global virtual teams offer a wide range of potential benefits but implementation of GVTs will be at risk if challenges faced by them are not addressed adequately. The premise of the study is based on the assumption that organizations must be able to adapt to different work styles and cultures, leverage team processes, and utilize appropriate technologies to create efficiencies in the global workplace. The remainder of the chapter describes the research questions and sets definitional framework for global virtual teams. The last section of the chapter highlights the significance of the study and its benefits to both academicians and practitioners.

Chapter two concentrates on understanding the existing literature on teams and global virtual teams in related disciplines – like management, information systems, and psychology. The first half of the chapter is divided in chronological progression of global virtual teams and their extension from traditional or co-located teams. The literature on team work in organizations is analyzed based on the traditional I-P-O framework followed by similar analysis of literature on virtual teams and global virtual teams. After establishing theoretical and empirical differences between traditional and virtual teams, a review of literature and theories on collaborative partnership is presented. A comprehensive analysis on literature on diversity, as pertaining to management teams, is

conducted and opposing views on different aspects of diversity are identified. The chapter closes with literature review on collaborative technology.

Chapter two is concluded by building arguments for the following points:

(1) Research on GVT is fragmented and much of the focus of this research has been on comparisons of traditional teams with GVT.

(2) The research on diversity on GVT is still at its nascent stage and lacks empirical evidence.

(3) Focus has been on treating diversity as an individual construct without understanding the various facets or types of diversity present in GVT.

(4) The research on relationship building in GVT and its effect on team effectiveness has looked at isolated constructs without understanding their combined effects. Elements of collaborative partnership – mutual benefits, shared goals, mutual trust, and shared knowledge, are scantily researched in GVT literature but a more in-depth and holistic understanding is still lacking.

(5) The role of collaborative technology in moderating the relationship between diverse team members and relationship building has not been fully explored and lacks empirical validation.

The conceptual research model is the core of chapter three. Based on traditional I-P-O framework, the conceptual model is developed which draws from existing theory and extends current research. Team diversity, comprising of three levels: surface level, functional level, and deep level, is included as the central tenet of team input. At the process level is the construct of collaborative partnership among team members.

Moderating this relationship between input and process are two modifiers – collaborative technology and task (task interdependence and task complexity). At the outcome level is the construct of GVT effectiveness, which includes both team performance and members' satisfaction with the team. Hypotheses pertaining to relationships among these constructs are developed to conclude the chapter.

Having stated the theoretical framework, chapter four is devoted to discussing and describing the research strategy for this study. A field survey methodology is adopted for collecting data, keeping in consideration the generalizability of the results. Data collection procedure is highlighted, appropriate sampling strategy is identified and instrument development is detailed. Measurement of various variables using items from validated instruments is portrayed. The remainder of the chapter discusses some preliminary results from the pre-pilot and pilot study, and lists modifications to be applied to the final instrument.

Chapter five and six focus on the analysis of the collected data and discussion of the results, respectively. Chapter five is sub divided into three major sections. The first section establishes the reliability of measurement scales and reports on the four step process of validation adopted for the study. First, initial reliability of the scale is assessed using the coefficient alpha. Second, to ensure that items measure their respective constructs, construct validity of each scale is assessed using two methods (1) correlation between total scores and item scores for both overall constructs variables (2) factor analysis - exploratory factor analysis was used to assure scale item's unidimensionality. Third, convergent and dicriminant validity of the scale was assessed using the MTMM

approach, and finally (4) final reliabilities of the modified scales are examined using Cronbach's alpha.

The second section of chapter five focusses on describing and reporting the aggregating issues involved with multi-level data. James index $R_{wg}(j)$, ICC(1) and ICC(2) are analyzed to justify data aggregation. The third section of chapter five details the hypotheses testing of moderation, mediation and direct effects. Hierarchical moderated regression analysis (HMRA) approach as described by Baron and Kenney (1986) is used to test the hypotheses. The moderation hypotheses are tested individually by entering control variables in the equation initially, followed by predictor variables and interaction terms. Mediation of collaborative partnership was tested using mediated regression approach.

Chapter six offers discussion of the empirical findings in relation to research questions established in chapter one. The findings of the study clearly demonstrate that diversity plays a significant role in establishing relationships among members of the global virtual teams. Further, findings confirm that both collaborative technology and task features moderate the relationship between collaborative partnership and member diversity. Mediation effects of collaborative partnership on the relationship between member diversity and GVT effectiveness are also significant.

7.3 Limitations

The research findings establish the hypothesized relationship and confirm the causality. Before interpreting these results and discussions, it is imperative that the

limitations from the study are acknowledged and caution is administered in generalizing the results of the study. There are a few limitations that warrant further discussion.

Reliance on self report measures

One of the limitations of this study is its reliance on self-reported measures. This is a limitation generally attributable to the survey based research. Since all the items in the instrument are seeking responses from team members on team level constructs, respondents might be biased in their reporting. A number of potential steps were implemented to control for accurate responses, which include designing the items appropriately to capture team level response, organization of items in different sections and ensuring collection of responses from at least two members of the GVT.

Sample Size

Another limitation relates to the sample size for hypotheses testing. Even though the findings are based on data provided by 213 individuals, the team level analysis was reduced to 58 teams. Although this sample size is similar to or better than many published studies on teams, the statistical power of the analysis is limited and warrants caution. Inspite of this limitation, the relatively strong effects that were observed seem to provide evidence of relationship among constructs.

Common Method Variance

Podsakoff P.M, MacKenzie, Lee, and Podsakoff, N.P. (2003) state that common method variance, that is attributable to the measurement method rather than to the constructs the measures represent, is a potential problem in behavioral research. They identify four sources of common method variance as arising from having a common rater,

a common measurement context, a common item context, or arising from the characteristics of the items themselves.

This common method variance produced by a common source or rater results from the fact that the respondent providing the measure of the predictor and criterion variable is the same person. In existing literature on teams, this variance is resolved by having team supervisors' respond on the dependent variable and team members' respond on the independent variable. Similar efforts were initially considered for this study, but due to limitations of supervisors' availability and in some cases the supervisor himself being a member of the team and involved in operations of the team, gathering supervisor responses separately was not considered further. Alternatively stakeholder responses were requested and a total of 7 responses for 7 different teams were collected. This method was also not pursued further as stakeholder's availability was constrained.

Thus, responses on GVT effectiveness, the dependent variable, were collected from team members, per the above discussion which leads to common method variance. In order to assess the common method variance and similarity of responses from team stakeholders and team members on GVT effectiveness, a t-test was conducted between two data sets, 7 responses from stakeholders and responses from members of these 7 team on GVT effectiveness, to test for differences. The test statistic was not significant thus confirming the hypotheses that means between stakeholders response and member response are not different.

Another method employed to reduce common method variance as proposed by Podsakoff P.M, MacKenzie, Lee, and Podsakoff, N.P. (2003) is to separate the measures

of predictor and dependent variable. This technique was also employed in the study by separating the GVT effectiveness items from other items in the instrument. In addition, other techniques like improving scale items, reducing ambiguity, and increasing social desirability of the items were employed to reduce common method variance.

Treatment of non-response

A final point relates to the treatment of non-response. In team level research based on individual data, non-response issues are somewhat more complicated than, for example, in individual-level research. Ideally, each team should be represented by a number of respondents that is sufficiently large to provide a reliable impression of the team situation that is not disproportionally colored by one or a few team members. In team based research, this may, however, be a luxury that many researchers cannot afford, since sampling a sufficiently large number of teams in itself already is a major challenge.

Thus prior to aggregating individual responses to the group level, within-group agreement is analyzed to assure that perceptions of the team construct were sufficiently similar, is analyzed. James index $R_{wg}(j)$ and ICC(1) and ICC(2) values are calculated and reported. The values supported within-group agreement.

7.4 Future Research

Based on the findings of this study and theoretical consideration a number of potential future research opportunities can be considered. Primary among them are listed below.

Developmental View

One of the possible future research avenues could be analyzing the effect of time on the development of collaborative partnership among diverse team members. Even though team tenure was included in the analysis as a control variable, it could still lead to significant changes in relationships. Calls for understanding global virtual teams from a developmental perspectives have been made in the past (Jarvenpaa and Leidner 1999; Sarkar and Sahay 2003), but empirical evidence for such is still lacking from current IS research. It would be interesting to compare and contrast the effects of various levels of diversity on GVT effectiveness over different time periods.

Additional Levels of Diversity

This study included only three levels of diversity, it is possible that some important effects of diversity were not detected in our analysis. Future research can include more levels or sub levels of diversity and examine their effects on collaborative partnership and GVT effectiveness. Some of the additional forms of diversity which have been established in traditional team literature include – dominant function diversity, functional background diversity, functional assignment diversity (Bunderson and Sutcliffe 2002), participative diversity (Qureshi et al. 2000), and structural diversity (Cummings 2004).

Conflict and its Role

Conflict was included as one of the elements of collaborative partnership in this study. Empirical evidence highlighted conflict as a separate construct in itself. Further research could be conducted on understanding the role of conflict in diverse global virtual

teams. Researchers have long stated that conflict is an important process that allows teams to make better decisions because more alternatives are generated and considered prior to decision being reached (Jehn and Mannix 2001). Research could be focused on understanding what types of conflict - task, relational, or process – is significant in GVT, how this conflict is resolved, and does it improves GVT effectiveness (Kankanhalli et al. 2006).

Leadership Roles

Another recommended future area is global virtual team leadership. Existing research on leadership in GVT has established that maintaining effective team communication is a chief responsibility of leadership (Zaccaro et al. 2003). It is also proposed that the GVT leader role seems likely to be different from that of a traditional team leader. The GVT Leader role is more about facilitating, empowering team members to take action on their own (Avolio et al. 2000). In light of such findings research could explore how GVT leaders exercise power and influence, facilitate communication, and enable partnership building among diverse team members. It would be of theoretical and practical interest to understand what actions team leaders can take to (a) foster relationship building among diverse members, (b) coordinate the discussion, task, and communication, and (c) decide on appropriate technology adoption and use in such a way that facilitates critical team processes and enhances relationships.

Type of Teams

The literature on global virtual teams suggests and builds upon an "ideal type" of arrangement, in which member's pool resources, skills, and knowledge at a short notice,

despite the barriers of time and space. Duarte and Snyder (2001) state seven different types of virtual teams – networked teams, parallel teams, project or product-development teams, work or production teams, service teams, management teams, and action teams. The very nature of such teams and their informational requirements vary. For example the key purpose of product development teams will be knowledge creation, where as in service teams the purpose would be knowledge and skill transfer. Future research could be focused towards understanding the diversity and partnerships requirements in different types of teams.

REFERENCES

Ahuja, M., and Galvin, J. "Socialization in Virtual Groups," *Journal of Management* (29:2), 2003, pp. 161-185.

Aiken, L.S., and West, S.G. *Multiple Regression: Testing and Interpreting Interactions*, Sage, Newbury Park CA, 1991.

Alge, B.J., Wiethoff, C., and Klein, H.J. "When Does The Medium Matter? Knowledge-Building Experiences And Opportunities In Decision-Making Teams," *Organizational Behavior and Human Decision Processes* (91), 2003, pp. 26-37.

Amison, L., and Miller, P. "Virtual Teams: A Virtue for the Conventional Team," *Journal of Workplace Learning* (14:4), 2002, pp. 166-175.

Ancona, D.G., and Caldwell, D.F. "Demography and Design: Predictors of New Product Team Performance," *Organization Science* (3:3), 1992, pp. 321-341.

Anderson, J.C., and Narus, J.A. "A model of Distributor Form and Manufacturer Firm Working Partnerships," *Journal of Marketing* (54:1), 1990, pp. 42-58.

Anderson, L.R. "Small Group Behavior," In *Management of Urban Crisis*, S. E. Seashore and R. J. McNeill (eds.), Free Press, New York, 1971.

Argote, L., and McGrath, J.E. "Group Processes in Organizations: Continuity and Change," In *International Review of Industrial and Organizational Psychology*, C. L. Cooper and I. T. Robertson (eds.), 8, Wiley, New York, 1993, pp. 333-389.

Aubert, B.A., and Kelsey, B.L. "Further Understanding Of Trust And Performance In Virtual Teams," *Small Group Research* (34), 2003, pp. 575-618.

Austin, J.R. "Transactive Memory in Organizational Groups: The Effects of Content, Consensus, Specialization, and Accuracy on Group Performance," *Journal of Applied Psychology* (88), 2003, pp. 866-878.

Avolio, B.J., S.S. Kahai, S.S., and Dodge, G.E. "E-Leadership: Implications for Theory, Research, and Practice," *Leadership Quarterly* (11:4), 2000, pp. 615-669.

Baker, G. "The Effects Of Synchronous Collaborative Technologies On Decision Making: A Study Of Virtual Teams.," *Information Resources Management Journal* (15), 2002, pp. 79-93.

Bantel, K., and Jackson, S.E. "Top Managment & Innovations in Banking: Does The Composition of Top Team Make a Difference?," *Strategic Management Journal* (10), 1989, pp. 107-124.

Bantel, K.A. "Strategic Planning Openness: The Role of Top Team Demography," *Group and Organization Management Science* (19:4), 1994, pp. 406-424.

Baron, R.M., and Kenny, D.A. "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, and Statistical Considerations," *Journal of Personality and Social Psychology* (51:6), 1986, pp. 1173-1182.

Beal, D.J., Cohen, R.R., Burke, M.J., and McLendon, C.L. "Cohesion and Performance in Groups: A Meta-analytic Clarification of Construct Relations.," *Journal of Applied Psychology* (88), 2003, pp. 989-1004.

Becker, J.D., Ballentine, R., Lee, A., and Townsley, C. "Collaborative Technology Tools for Virtual Teaming," *Proceedings of the 5th Americas Conference on Information Systems*, Milwaukee, WI, 1999, pp. 334-336.

Beersma, B., Hollenbeck, J.R., Humphrey, S.E., Moon, H., and Conlon, D.E. "Cooperation, Competition, and Team Performance: Toward a Contingency Approach.," *Academy of Management Journal* (46), 2003, pp. 572-590.

Bell, B.S., and Kozlowski, S.W.J. "A Typology of Virtual Teams: Implications for Effective Leadership," *Group and Organization Management* (27:1), 2002, pp. 14-49.

Berdahl, J.L. "Gender and Leadership in Work Groups: Six Alternative Models," *Leadership Quarterly* (7:1), 1996, pp. 21-40.

Bhappu, A.D., Griffith, T.L., and Northcraft, G.B. "Media Effects and Communication Bias in Diverse Groups," *Organizational Behavior and Human Decision Processes* (70:3), 1997, pp. 199-205.

Bhappu, A.D., Zellmer-Bruhn, M., and Anand, V. "The Effects of Demographic Diversity and Virtual Work Environments on Knowledge Processing in Teams," *Advances in the Interdisciplinary Study of Work Teams* (8), 2001, pp. 149–165.

Bion, W.R. *Experiences in Groups*, Tavistock Publications, London, 1961.

Blau, P.M. *Exchange and Power in Social Life*, John Wiley and Sons, New York, 1964.

Bliese, P.D. "Within-Group Agreement, Non-Independence, and Reliability: Implications for Data Aggregation and Analysis," In *Multilevel Theory, Research, and Methods in Organizations*, K. J. Klein and S. W. J. Kozlowski (eds.), Josset-Bass, San Francisco, 2000, pp. 349-381.

Bock, G., Zmud, R.W., Kim, Y., and J.Lee "Behavioral Intention Formation In Knowledge Sharing: Examining The Roles Of Extrinsic Motivators, Social-Psychological Forces, And Organizational Climate," *MIS Quarterly* (29:1), 2005, pp. 87-111.

Bock, G.W., and Kim, Y.G. "Breaking the Myths of Rewards: An Exploratory Study of Attitudes about Knowledge Sharing," *Information Resource Management Journal* (15), 2002,
Bolman, L.G., and Deal, T.E. "What Makes a Team Work?," *Organizational Dynamics* (21:2), 1992, pp. 34-44.

Bosch, F.V.d., Volberda, H., and Boer, M. "Co-evolution of Firm Absorptive Capacity and Knowledge Environment: Organizational Forms and Combinative Capabilities," *Organization Science* (10:5), 1999, pp. 551-568.

Bunderson, J.S. "Team Member Functional Background and Involvement in Management Teams: Direct Effects and the Moderating Role of Power Centralization," *Academy of Management Journal* (46:4), 2003, pp. 458-474.

Bunderson, J.S., and Sutcliffe, K.M. "Comparing Alternative Conceptualizations Of Functional Diversity In Management Teams: Process And Performance Effects," *Academy of Management Journal* (45:5), 2002, pp. 875-893.

Burgoon, J.K., J.A.Bonito, Ramirez, A.J., Dunbar, N.E., Kam, K., and Fischer, J. "Testing the Interactivity Principle: Effects of Mediation, Propinquity, and Verbal and Nonverbal Modalities in Interpersonal Interaction," *Journal of Communication* (52:3), 2002, pp. 657-677.

Byrk, A.S., and Raudenbush, S.W. *Hierarchical Linear Models*, Sage, Thousand Oaks, CA, 1992.

Byrne, D.E. *The Attraction Paradigm*, Academic Press, New York, 1971.

Cambell, D.T., and Fiske, D.W. "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," *Psychological Bulletin* (56:2), 1959, pp. 81-105.

Campion, M.A., Medskar, G.J., and Higgs, A.C. "Relations Between Work Group Characteristics and Effectiveness: Implications for Designing Effective Work Groups," *Personnel Psychology* (46:4), 1993, pp. 823-850.

Campion, M.A., Papper, E.M., and Medsker, G.J. "Relations Between Work Team Characteristics and Effectiveness: A Replication and Extension," *Personnel Psychology* (49), 1996, pp. 429-452.

Caouette, M.J., and O'Connor, B.N. "The Impact of Group Support Systems on Corporate Teams' Stages of Development," *Journal of Organizational Computing and Electronic Commerce* (8:1), 1998, pp. 57-81.

Carlson, J.R., and Zmud, R.W. "Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions," *Academy of Management Journal* (42:2), 1999, pp. 153-170.

Carpenter, M.A., and Fredrickson, J.W. "Top Management Teams, Global Strategic Posture, and the Moderating Role of Uncertainty," *Academy of Management Journal* (44:3), 2001, pp. 533-545.

Carte, T., and Chidambaram, L. "A Capabilities-Based Theory of Technology Deployment in Diverse Teams: Leapfrogging the Pitfalls of Diversity and Leveraging Its Potential with Collaborative Technology," *Journal of the Association for Information Systems* (5:11-12), 2004, pp. 448-471.

Chatman, J.A., and Flynn, F.J. "The Influence of Demographic Heterogeneity on the Emergence and Consequences of Cooperative Norms in Work Teams," *Academy of Management Journal* (44), 2001, pp. 956-974.

Chatman, J.A., Polze, J.T., Barsade, S.G., and Neale, M.A. "Being Different Yet Feeling Similar: The Influence of Demographic Composition and Organizational Culture on Work Processes and Outcomes," *Administrative Science Quarterly* (43), 1998, pp. 749-780.

Churchill, G.A. "A Paradigm for Developing Better Measures of Marketing Constructs," *Journal of Marketing Research* (16), 1979, pp. 64-73.

Cohen, J., Cohen, P., West, S.G., and Aiken, L.S. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, Erlbaum, Mahwah, NJ, 2003.

Cohen, S.G., and Bailey, D.E. "What Makes Team Work: Group Effectiveness Research From the Shop Floor to the Executive Suite," *Journal of Management* (23:3), 1997, pp. 239-291.

Connaughton, S.L., and Shuffler, M. "Multinational and Multicultural Distributed Teams: A Review and Future Agenda," *Small Group Research* (38:3), 2007, pp. 387-412.

Cook, J., and Wall, T. "New Work Attitudes Measures of Trust: Organizational Commitment and Personal Need Fulfilment," *Journal of Occupational Psychology* (53:1), 1980, pp. 39-52.

Cox, T., and Blake, S. "Managing Cultural Diversity: Implications for Organizational Competitiveness," *Academy of Management Executive* (5:3), 1991, pp. 45-56.

Cramton, C.D., and Orvis, K.L. "Overcoming Barriers to Information Sharing in Virtual Teams," In *Virtual Teams that Work: Creating Conditions for Virtual Team Effectiveness*, C. B. Gibson and S. G. Cohen (eds.), Jossey-Bass, San Francisco, 2003, pp. 214-229.

Cronbach, L.J. "Coefficient alpha and the internal structure of tests," *Psychometrika* (16), 1951, pp. 297-334.

Cummings, J.N. "Work Groups, Structural Diversity, and Knowledge Sharing in a Global Organization," *Management Science* (50:3), 2004, pp. 352-364.

Daft, R.L., Lengel, R.H., and Trevino, L.K. "Message Equivocality, Media Selection and Manager Performance: Implications for Information Systems," *MIS Quarterly* (11:3), 1987, pp. 355-368.

Dailey, B.F., and Steiner, R.L. "The Influence of Group Decision Support Systems on Contribution and Commitment Levels in Multicultural and Culturally Homogenous Decision-Making Groups," *Computers in Human Behavior* (14:1), 1998, pp. 147-162.

Dean, J.W., and Snell, S.A. "Integrated Manufacturin and Job Design: Moderating Effects of Organizational Inertia," *Academy of Management Journal* (34:4), 1991, pp. 776-804.

Desanctis, G., and Poole, M.S. "Capturing the Complexity in Advancaed Technology Use: Adaptive Structuration Theory," *Organization Science* (5:2), 1994, pp. 121-147.

Desanctis, G., and Poole, M.S. "Transitions in Teamwork in New Organizational Forms," *Advances in Group Processes* (14), 1997, pp. 157-176.

Dickson, G.W., and DeSanctis, G. *Information technology and the future enterprise: new models for managers*, Prentice Hall, Upper Saddle River, New Jersey, 2001.

Dirks, K.T. "The Effects of Interpersonal Trust on Work Group Performance," *Journal of Applied Psychology* (84), 1999, pp. 445-455.

Doll, W.J., and Torkzadeh, G. "The Measurement of End-User Computing satisfaction," *MIS Quarterly* (June), 1988, pp. 259-274.

Dreu, C.K.W.D., and Weingart, L.R. "Task Versus Relationship Conflict: A Meta-Analysis," *Journal of Applied Psychology* (88), 2003, pp. 741-749.

Driskell, J.E., Radtke, P.A., and Salas, E. "Virtual Teams: Effects of Technological Mediation on Team Performance," *Group Dynamics: Theory, Research, and Practice* (7:4), 2003, pp. 297-323.

Druskat, V.U., and Wolff, S.B. "Effects and Timing of Developmental Peer Appraisals in Self-managing Work Groups.," *Journal of Applied Psychology* (84), 1999, pp. 58-74.

Dubrovsky, V., Kiesler, S., and Sethna, B. "The Equalization Phenomenon: Status Effects in Computer Mediated and Face-to-Face Decision Making Groups," *Human Computer Interaction* (6:2), 1991, pp. 119-146.

Earley, P.C. "East Meets West Meet Mideast: Further Explorations of Collectivistic and Inidvidualistic Work Groups," *Academy of Management Journal* (36:2), 1993, pp. 319-348.

Earley, P.C., and Mosakowski, E. "Creating Hybrid Team Cultures: An Empirical Test of Transnational Team Functioning," *Academy of Management Journal* (43:1), 2000, pp. 26-49.

Eby, L.T., and Dobbins, G.H. "Collective Orientation in Teams: An Individual and Grouplevel Analysis," *Journal of Organizational Behavior* (18:3), 1997, pp. 275-295.

Eder, L.B., and Igbaria, M. "Determinants of Intranet Diffusion and Infusion," *Omega* (29:3), 2001, pp. 233-242.

Ellis, A.P.J., Hollenbeck, J.R., Ilgen, D.R., Porter, C.O.L.H., West, B.J., and Moon, H. "Team Learning: Collectively Connecting the Dots.," *Journal of Applied Psychology* (88), 2003, pp. 821-835.

Ely, R.J., and Thomas, D.A. "Cultural Diversity at Work: The Effects of Diversity Perspectives On Work Group Processes and Outcomes," *Administrative Science Quarterly* (46:2), 2001, pp. 229-273.

Epstein, S. "The Stability of Behavior: II. Implications for Psychological Research," *American Psychologist* (35), 1980, pp. 790-806.

Fontana, A., and Frey, J.H. "Interviewing: The Art of Science, Collecting And Interpreting Qualitative Materials," N. K. Denzin and Y. S. Lincoln (eds.), Sage Publication, Thousand Oaks, 1998, pp. 47-78.

Frazier, P.A., Tix, A.P., and Barron, K.E. "Testing Moderator and Mediator Effects in Counseling Psychology Research," *Journal of Counseling Psychology* (51:1), 2004, pp. 115-134.

Fry, L.W., and Slocum, J.W. "Technology, Structure, and Workgroup Effectiveness: A Test of a Contingency Model," *Academy of Management Journal* (27), 1984, pp. 221-246.

Furst, S., Blackburn, R., and Rosen, B. "Virtual Team Effectiveness: A Proposed Research Agenda," *Information Systems Journal* (9:4), 1999, pp. 249-269.

Galegher, J., and Kraut, R.E. "Computer-mediated Communication for Intellectual Teamwork: An Experiment in Group Writing," *Information Systems Research* (5), 1994, pp. 110-138.

Gibson, C.B. "Do They Do What They Believe They Can? Group Efficacy and Group Effectiveness Across Tasks and Cultures.," *Academy of Management Journal* (42), 1999, pp. 138-152.

Gibson, C.B., and Cohen, S.G. "In the Beginning: Introduction and Framework," In *Virtual Teams that Work: Creating Conditions for Virtual Team Effectiveness*, C. B. G. a. S. G. Cohen (ed.) Jossey-Bass, San Francisco, 2003, pp. 1-13.

Gibson, C.B., and Gibbs, J.L. "Unpacking the Concept of Virtuality: The Effects of Geographic Dispersion, Electronic Dependence, Dynamic Structure, and National Diversity on Team Innovation," *Administrative Science Quarterly* (51:3), 2006, pp. 451-495.

Gibson, C.B., and Vermeulen, F. " A Healthy Divide: Subgroups as a Stimulus for Team Learning Behavior," *Administrative Science Quarterly* (48), 2003, pp. 202-239.

Gladstein, D. "Groups in Context: a Model of Task Group Effectiveness," *Administrative Science Quarterley* (29), 1984, pp. 499-517.

Glass, R.L. "Pilot studies : What ,Why and How," *Journal of System Software* (36:1), 1997, pp. 85-97.

Gonzalez, M.G., Burke, M.J., Santuzzi, A.M., and Bradley, J.C. "The Impact of Group Process Variables on The Effectiveness of Distance Collaboration Groups," *Computing and Human Behavior* (19), 2003, pp. 629-648.

Goodman, P.S. "Impact of Task and Technology on GroupPerformance," In *Desiging Effective Work Groups*, P. S. Goodman (ed.) Jossey-Bass, San Francisco, 1986, pp. 120-167.

Goodman, P.S., and Leyden, D.P. "Familiarity and Group Productivity.," *Journal of Applied Psychology* (76), 1991, pp. 578-586.

Griffith, T.L., and Neale, M.A. "Information Processing in Traditional, Hybrid, and Virtual Teams: From Nascent Knowledge to Transactive Memory," *Research in Organizational Behavior* (23), 2001, pp. 379-421.

Griffith, T.L., Sawyer, J.E., and Neale, M.A. "Virtualness and Knowledge in Teams : Managing the Love Triange of Organizations, Individuals, and Information Technology," *MIS Quarterly* (27:2), 2003, pp. 265-287.

Grimes, A.J., and Klein, S.M. "The Technology Imperative: The Relative Impact of Task Unit, Modal technology and Hierarchy on Structure," *Academy of Management Journal* (16), 1973, pp. 583-597.

Gully, S.M., Incalcaterra, K.A., Joshi, A., and Beaubian, J.M. "A Meta-analysis of Team-efficacy, Potency, and Performance: Interdependence and Level of Analysis as Moderators of Observed Relationships," *Journal of Applied Psychology* (87), 2002, pp. 819-832.

Guzzo, R.A., and Dickson, M.W. "Teams in Organizations: Recent Research on Performance and Effectiveness," *Annual Review of Psychology* (47), 1996, pp. 307-338.

Hackman, J.R. "A Normative Model of Work Team Effectiveness," In *Yale School of Organization and Management, Research Program on Groups Effectiveness*, New Haven, CT, 1983,
Hackman, J.R. *Groups That Work and Those That Don't*, Jossey-Bass, San Fransisco, 1990.

Hackman, J.R., and Morris, C.G. "Group Task, Group Interaction Process, and Group Performance Effectiveness: A Review and Proposed Integration," In *Advances in Experimental Social Psychology*, L. Berkowitz (ed.) 8, Academic Press, San Diego, CA, 1975, pp. 45-99.

Hambrick, D.C., Cho, T.S., and Chen, M.J. "The Influence of Top Management Team Heterogeneity on Firms' Competitive Moves," *Administrative Science Quarterly* (41:4), 1996, pp. 659-684.

Handerson, J.C. "Plugging into Strategic Partnerships: The Critical IS connection," *Sloan Management Review* (31:3), 1990, pp. 7-18.

Handerson, J.C., and Lee, S. "Managing I/S Design Teams: A Control Theories Perspective," *Management Science* (38:6), 1992, pp. 757-777.

Hardin, A.M., Fuller, M.A., and Davison, R.M. "I Know I Can, But Can We?: Culture and Efficacy Beliefs in Global Virtual Teams," *Small Group Research* (38:1), 2007, pp. 130.

Harrison, D.A., Price, K.H., and Bell, M.P. "Beyond Relational Demography: Time and Effects of Surface-and Deep-Level Diversity on Work Group Cohesion," *Academy of Management Journal* (41:1), 1998, pp. 96-107.

Harrison, D.A., Price, K.H., Gavin, J.H., and Florey, A.T. "Time, Teams, and Task Performance: Changing Effects of Surface and Deep Level Diversity on Group Functioning," *Academy of Management Journal* (45:5), 2002, pp. 1029-1045.

Hecht, T.D., Allen, N.J., Klammer, J.D., and Kelly, E.C. "Group Beliefs, Ability, and Performance: The Potency of Group Potency.," *Group Dynamics: Theory, Research, and Practice* (6), 2002, pp. 143-152.

Hertel, G., Deter, C., and Konradt, U. "Motivation Gains In Computer-Supported Teams," *Journal of Applied Psychology* (33), 2003, pp. 2080-2105.

Hertel, G., Geister, S., and Konradt, U. "Managing Virtual Teams: A Review of Current Empirical Research," *Human Resource Management Review* (15), 2005, pp. 69-95.

Hertel, G., U., K., and Orlikowski, B. "Managing Distance by Interdependence: Goal Setting, Task Interdependence, and Team Based Rewards in Virtual Teams," *European Journal of Work and Organizational Psychology* (13), 2004, pp. 1-28.

Hightower, R.T., and L.Sayeed "Effects of Communication Mode and Prediscussion Information Distribution Charachteristics on Information Exchange in Groups," *Information Systems Research* (7:4), 1996, pp. 451-465.

Hinds, P., and Kiesler, S. "Communication Across Boundaries: Work, Structure, and Use of Communication Technologies in a Large Organization," *Organization Science* (6:4), 1995, pp. 373–393.

Hinds, P.J., and Bailey, D.E. "Out Of Sight, Out Of Sync: Understanding Conflict In Distributed Teams," *Organization Science* (14:6), 2003, pp. 615-632.

Hinds, P.J., Carley, K.M., Krackhardt, D., and Wholey, D. "Choosing Work Group Members:Balancing Similarity, Competence, and Familiarity," *Organizational Behavior and Human Decision Processes* (81:2), 2000, pp. 226-251.

Hofstede, G. *Culture's Consequences*, Sage, Beverly Hills, CA, 1980.

Holton, J.A. "Building Trust And Collaboration In A Virtual Team," *Team Performance Management* (7:3/4), 2001, pp. 36-47.

Homans, G.C. *Social Behavior: Its Elementary Forms*, Harcourt Brace and World, New York, 1961.

Huang, W.W., Wei, K., Watson, R.T., and Tan, B.C.Y. "Supporting Virtual Team-Building With A GSS: An Empirical Investigation," *Decision Support Systems* (34), 2002, pp. 359-367.

Huber, G.P. "A Theory of the Effects of Advanced Information Technologies on Organizational Design, Intelligence, and Decision Making," *Academy of Management Review* (15:1), 1990, pp. 47-71.

Hurst, D.K., Rush, J.C., and White, R.E. "Top Management Teams and Organizational Renewal," *Strategic Management Journal* (10), 1989, pp. 87-105.

Ilgen, D.R. "Teams Embedded in Organizations: Some Implications," *American Psychologist* (54:2), 1999, pp. 129-139.

Ilgen, D.R., Hollenback, J.R., Johnson, M., and Jundt, D. "Teams in Organizations: From Input-Process-Output Models to IMOI Models," *Annual Review of Psychology* (56), 2005, pp. 517-543.

Ives, B., and Jarvenpaa, S.L. "Applications of Global Information Technology: Key Issues for Management," *MIS Quarterly* (15:1), 1991, pp. 33-49.

Ives, B., Olson, M.H., and Baroudi, J.J. "The Measurement of User Information Satisfaction," *Communications of the ACM* (26:10), 1983, pp. 785-793.

Jackson, N.F., Aiken, M.W., Vanjani, M.B., and Hasan, B.S. "Support Group Decisions via Computer Systems," *Quality Progress* (28:5), 1995, pp. 75.

Jackson, S.E., Brett, J.F., Sessa, V.I., Cooper, D.M., Julin, J.A., and Peyronnin, K. "Some Differences Make a Difference: Individual Dissimilarity and Group Heterogeneity as

Correlates of Recruitment, Promotions, and Turnover," *Journal of Applied Psychology* (76:5), 1991, pp. 675-689.

Jackson, S.E., Joshi, A., and Erhardt, N.L. "Recent Research on Team and Organizational Diversity: SWOT Analysis and Implications," *Journal of Management* (29:6), 2003, pp. 801-830.

Jackson, S.E., May, K.E., and Whitney, K. "Understanding the Dynamics of Diversity in Decision-making Teams," In *Team Effectiveness and Decision Making in Organizations*, E. S. R. A. Guzzo, & Associates (ed.) Jossey-Bass, San Francisco, CA, 1995 b, pp. 204-261.

James, L.R. "Aggregation Bias in Estimates of Perceptual Agreement," *Journal of Applied Psychology* (67), 1982, pp. 219- 229.

James, L.R., Demaree, R.G., and Wolf, G. "Estimating Within-group Interrater Reliability With and Without Response Bias," *Journal of Applied Psychology* (69), 1984, pp. 85-98.

Janssens, M., and Brett, J.M. "Cultural Intelligence in Global Teams: A Fusion Model of Collaboration," *Group and Organization Management* (31:1), 2006, pp. 124-153.

Janz, B.D., Colquitt, J.A., and Noe, R.A. "Knowledge Worker Team Effectiveness: The Role of Autonomy, Interdependence, Team Development, and Contextual Support Variables," *Personnel Psychology* (50:4), 1997, pp. 877-904.

Jarvenpaa, S.L., Knoll, K., and Leidner, D.E. "Is Anybody Out There? Antecedents of Trust in Global Virtual Teams," *Journal of Management Information Systems* (14:4), 1998, pp. 29-64.

Jarvenpaa, S.L., and Leidner, D.E. "Communication and Trust in Global Virtual Teams," *Organization Science* (10:6), 1999, pp. 791-815.

Jehn, K. "A Qualitative Analysis of Conflict Types and Dimensions in Organizational Groups," *Administrative Science Quarterly* (42:3), 1997, pp. 530-557.

Jehn, K.A. "Enhancing Effectiveness: An Investigation of Advantages and Disadvantages of Value-based Intragroup Conflict.," *International Journal of Conflict Management* (5), 1994, pp. 223-238.

Jehn, K.A. "A Multimethod Examination of the Benefits and Detriments of Intragroup Conflict," *Administrative Science Quarterly* (40:2), 1995, pp. 256-282.

Jehn, K.A., and Mannix, E.A. "The Dynamic Nature of Conflict: A Longitudinal Study of Intragroup Conflict and Group Performance," *Academy of Management Journal* (44), 2001, pp. 238-251.

Jehn, K.A., Northcraft, G.B., and Neale, M.A. "Why Differences Make a Difference: A Field Study of Diversity, Conflict, and Performance in Workgroups," *Administrative Science Quarterly* (44:4), 1999, pp. 741-763.

Johnson, S.D., Suriya, C., Yoon, S.W., Berrett, J.V., and Fleur, J.L. "Team Development And Group Processes Of Virtual Learning Teams," *Computers and Education* (39), 2002, pp. 379-393.

Kaiser, K.M., and Hawk, S.R. "Evolution of Offshore Software Development: From Outsourcing to Co-sourcing," *MIS Quarterly Executive* (3:2), 2004, pp. 69-81.

Kankanhalli, A., Tan, B.C.Y., and Wei, K.-K. "Conflict and Performance in Global Virtual Teams," *Journal of Management Information Systems* (23:3), 2006-7, pp. 237-274.

Karau, S.J., and Williams, K.D. "Social Loafing: A Meta-analytic Review and Theoretical Integration.," *Journal of Personal and Social Psychology* (65), 1993, pp. 681-706.

Katzenbach, J.R., and Smith, D.K. "The Discipline of Teams," *Harvard Business Review* (71:2), 1993, pp. 111-121.

Kayworth, T., and Leidner, D. "The Global Virtual Manager: A Prescription For Success," *European Management Journal* (18), 2000, pp. 183-194.

Kayworth, T.R., and Leidner, D.E. "Leadership Effectiveness in Global Virtual Teams," *Journal of Management Information Systems* (18:3), 2002, pp. 7-41.

Keller, R.T. "Cross-functional Project Groups in Research and New Product Development: Diversity, Communications, Job Stress, and Outcomes," *Academy of Management Journal* (44:3), 2001, pp. 547-555.

Kerlinger, F.N. *Foundations of Behavioral Research*, McGraw-Hill, New York, 1978.

Kerr, N.L., and Tindale, R.S. "Group Performance and Decision Making," *Annual Review of Psychology* (55), 2004, pp. 623-655.

Kettinger, W.J., and Grover, V. "The Use Of Computer-Mediated Communication In An Interorganizational Context," *Decision Sciences* (28:3), 1997, pp. 513-555.

Kirchmeyer, C., and Cohen, A. "Multicultutral Groups: Their performance and Reactions with Constructive Conflict," *Group and Organization Management* (17), 1992, pp. 153-170.

Kirkman, B.L., and Rosen, B. "Beyond Self-management: The Antecedents and Consequences of Team Empowerment.," *Academy of Management Journal* (42), 1999, pp. 58-74.

Kirkman, B.L., Rosen, B., Tesluk, P.E., and Gibson, C.B. "The Impact of Team Empowerment on Virtual Team Performance: The Moderating Role of Face to Face Interaction," *Academy of Management Journal* (47:2), 2004, pp. 175-192.

Kirkman, B.L., and Shapiro, D.L. "The Impact of Cultural Values on Employee Resistance to Teams: Toward a Model of Globalized Self-managing Work Team Effectiveness," *Academy of Management Review* (22), 1997, pp. 730-757.

Kirkman, B.L., Tesluk, P.E., and Rosen, B. "The Impact of Demographic Heterogeneity and Team Leader– Team Member Demographic Fit on Team Empowerment and Effectiveness," *Group & Organization Management* (29:3), 2004b, pp. 334-368.

Kline, T.J.B. *Remaking Teams: The Revolutionary Research-Based Guide that Puts Theory into Practice*, Jossey-Bass, San Francisco, CA, 1999.

Kozlowski, S.W.J., Gully, S.M., Nason, E.R., and Smith, E.M. "Developing Adaptive Teams: A Theory of Compilation and Performance Across Levels and Time," In *The Changing Nature of Performance: Implications For Staffing, Motivation, and Development*, D. R. Ilgen and E. D. Pulakos (eds.), Jossey-Bass, San Francisco, 1999, pp. 240-292.

Krauss, R., and Fussell, S. "Mutual Knowledge and Communicative Effectiveness," In *Intellectual Teamwork: Social and Technological Foundations of Coorperative Work*, J. Galagher, R. Kraut and C. Egdio (eds.), Lawrence Erlbaum, Hillsdale, NJ, 1990,
Lasher, D.R., Ives, B., and Jarvenpaa, S.L. "USAA-IBM Partnerships in Information Technology: Managing the Image Project," *MIS Quarterly* (15:4), 1991, pp. 550-565.

Lawrence, B. "The Black Box of Organizational Demography," *Organization Science* (8), 1997, pp. 1-22.

Lea, M., and Spears, R. "Paralanguage and social perception in computer-mediated communication," *Journal of Organizational Computing* (2), 1992, pp. 321-341.

Lee, J.-N., and Kim, Y.-G. "Effect of Partnership Quality on IS Outsourcing Success: Conceptual Framework and Emperical Validation," *Journal of Management Information Systems* (15:4), 1999, pp. 29-61.

Leenders, R.T., Engelen, J.v., and Kratzer, J. "Virtuality, Communication, And New Product Team Creativity: A Social Network Perspective," *Journal of Engineering and Technology Management* (20), 2003, pp. 69-92.

Levine, J.M., and Moreland, R.L. "Progress in Small Group Research," *Annual Review of Psychology* (41), 1990, pp. 585-634.

Lewis, K. "Measuring Transactive Memory Systems in The Field: Scale Development and Validation," *Journal of Applied Psychology* (88), 2003, pp. 587-604.

Lind, M.R. "The Gender Impact of Temporary Virtual Work Groups," *IEEE Transactions on Professional Communication* (42), 1999, pp. 276-285.

Lipnack, J., and Stamps, J. *Virtual Teams. In: "Reaching Across Space, Time, and Organizations with Technology"*, John Wiley & Sons, New York, 1997.

Lou, H., and Scamell, R.W. "Acceptance of Groupware: the Relationships Among Use, Satisfaction, and Outcomes," *Journal of Organizational Computing and Electronic Commerce* (6:2), 1996, pp. 173-190.

Lovelace, K., Shapiro, D.L., and Weingart, L.R. "Maximizing Cross-functional New Product Teams' Innovativeness and Constraint Adherence: A Conflict Communications Perspective.," *Academy of Management Journal* (44), 2001, pp. 779-793.

Lurey, J.S., and Raisinghani, M.S. "An Empirical Study of Best Practices in Virtual Teams," *Information & Management* (38:8), 2001, pp. 523-544.

Magjuka, R.J., and Baldwin, T.T. "Team-based Employee Involvement Programs: Effects of Design and Administration," *Personnel Psychology* (44), 1991, pp. 793-812.

Majchrzak, A., Malhotra, A., and John, R. "Perceived Individual Collaboration Know-How Development Through Information Technology–Enabled Contextualization: Evidence from Distributed Teams," *Information Systems Research* (16:1), 2005, pp. 9-27.

Majchrzak, A., Rice, R., Malhotra, A., and Ba, S. "Technology Adaptation: The Case of a Computer-supported Inter-Organizational Virtual Team," *MIS Quarterly* (24:4), 2000, pp. 569-600.

Malhotra, A., and Majchrzak, A. "Enabling Knowledge Creation in Far-flung Teams: Best Practices for IT Support and Knowledge Sharing," *Journal of Knowledge Management* (8:4), 2004, pp. 75-88.

Malhotra, A., Majchrzak, A., Carmen, R., and Lott, V. "Radical Innovation Without Collocation: A Case Study of Boeing-Rocketdyne," *MIS Quarterly* (25:2), 2001, pp. 229-249.

Mannix, E., and Neale, M.A. "What Differences Make a Difference? The Promise and Reality of Diverse Teams in Organizations," *Psychological Science In The Public Interest* (6:2), 2005, pp. 31-55.

Marks, M.A., Mathieu, J.E., and Zaccaro, S.J. "A Temporally Based Framework and Taxonomy of Team Processes," *Academy of Management Review* (26:3), 2001, pp. 356-376.

Marks, M.A., Sabella, M.J., Burke, C.S., and Zaccaro, S.J. "The Impact of Cross-Training on Team Effectiveness," *Journal of Applied Psychology* (87), 2002, pp. 3-13.

Markus, M.L. "Electronic Mail as The Medium of Managerial Choice," *Organization Science* (5:4), 1994, pp. 502-527.

Martins, L.L., Gilson, L.L., and Maynard, M.T. "Virtual Teams: What Do We Know and Where Do We Go From Here?," *Journal of Management* (30:6), 2004, pp. 805-835.

Martins, L.L., Milliken, F.J., Wiesenfeld, B.M., and Salgado, S.R. "Racioethnic Diversity and Group Members' Experiences: The Role of the Racioethnic Diversity of the Organizational Context.," *Group and Organization Management* (28:1), 2003, pp. 75-106.

Maruping, L.M., and Agarwal, R. "Managing Team Interpersonal Processes Through Technology: A Task-Technology Fit Perspective," *Journal of Applied Psychology* (89:6), 2004, pp. 975-990.

Mason, R. "Evaluation Methodologies for Computer Conferencing Applications," In *Collaborative Learning Through Computer Conferencing: The Najdeen Papers*, A. Kaye (ed.) Springer-Verlag, Berlin, 1992, pp. 105-116.

May, A., and Carter, C. "A Case Study of Virtual Teamworking in the European Automotive Industry," *International Journal of Industrial Ergonomics* (27:3), 2001, pp. 171-186.

Maznevski, M.L. "Understanding Our Differences: Performance in Decision-Making Groups with Diverse Members," *Human Relations* (47:5), 1994, pp. 531-552.

Maznevski, M.L., and Chudoba, K.M. "Bridging Space Over Time: Global Virtual Team Dynamics and Effectiveness," *Organization Science* (11:5), 2000, pp. 473-492.

McGrath, J.E. *Groups: Interaction and Performance*, Prentice-Hall, Englewood Cliffs, NJ, 1964.

McGrath, J.E. "Small Group Research, That Once and Future Field: An Interpretation of the Past With an Eye to the Future," *Group Dynamics: Theory, Research, and Practice* (1:1), 1997, pp. 7-27.

Michel, J., and Hambrick, D.C. "Diversification Posture and Top Management Team Characteristics," *Academy of Management Journal* (35:1), 1992, pp. 9-37.

Miles, C., Miles, R.E., Perrone, V., and Edvinsson, L. "Some Conceptual and Research Barriers to the Utilization of Knowledge," *California Management Review* (40:3), 1998, pp. 281-288.

Miles, R.E., and Snow, C.C. "Organizations: New Concepts for New Forms," *California Management Review* (28:3), 1986, pp. 62-73.

Milliken, F.J., and Martins, L.L. "Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organizational Groups.," *Academy of Management Review* (21:2), 1996, pp. 402-433.

Montoya-Weiss, M.M., Massey, A.P., and Song, M. "Getting it Together: Temporal Coordination and Conflict Management in Global Virtual Teams," *Academy of Management Journal* (44:6), 2001, pp. 1251-1262.

Mortensen, M., and Hinds, P.J. "Conflict and Shared Identity in Geographically Distributed Teams," *International Journal of Conflict Management* (12:3), 2001, pp. 212-238.

Nemeth, G.J., and Staw, B. "The Tradeoffs of Social Control in Groups and Organizations," In *Advances in Experimental Social Psychology*, G. Greenwich (ed.) JAI Press, 1989, pp. 175-210.

Neuman, G.A., and Wright, J. "Team Effectiveness: Beyond Skills and Cognitive Ability," *Journal of Applied Psychology* (84), 1999, pp. 376-389.

Newsted, P.R., Huff, S.L., and Munro, M.C. "Survey Instruments in Information Systems," *MIS Quarterly* (22:4), 1998, pp. 553-554.

Nowak, K.L. "Sex Categorization In Computer Mediated Communication (CMC): Exploring The Utopian Promise," *Media Psychology* (5), 2003, pp. 83-103.

Nunnally, J.C. *Psychometric Theory*, McGraw-Hill, New York, 1978.

O'Reilly, C.A., Caldwell, D.F., and Barnett, W.P. "Work Group Demography, Social Integration, and Turnover," *Administrative Science Quarterly* (34:1), 1989, pp. 21-37.

Orlikowski, W.J. "The Duality of Technology: Rethinking the Concept of Technology in Organizations," *Organization Science* (3:3), 1992, pp. 398-427.

Orlitzky, M., and Benjamin, J.D. "The Effects of Sex Composition on Small-Group Performance in a Business School Competition," *Academy of Management Learning and Performance* (2:2), 2003, pp. 128-138.

Palvia, P., Leary, T.D., Mao, E., Midha, V., Pinjani, P., and A.F.Salam "Research Methodologies In MIS: An Update," *Communications of the AIS* (14), 2004, pp. 526-542.

Palvia, P.C. "A Model and Instrument for Measuring Small Business User Satisfaction with Information Technology," *Information & Management* (31), 1996, pp. 151-163.

Paul, S., Seetharaman, P., Samarah, I., and Mykytyn, P.P. "Impact of Heterogeneity and Collaborative Conflict Management Style on the Performance of Synchronous Global Virtual Teams," *Information and Management* (41), 2004, pp. 303-321.

Pauleen, D.J., and Yoong, P. "Facilitating Virtual Team Relationships Via Internet And Conventional Communication Channels," *Internet Research* (11), 2001, pp. 190-202.

Pelled, H.L. "Demographic Diversity, Conflict, and Work Group Outcomes: An Intervening Process Theory," *Organizational Science* (7:6), 1996, pp. 615-631.

Pelled, L.H., Eisenhardt, K.M., and Xin, K.R. "Exploring the Black Box: An Analysis of Work Group Diversity, Conflict, and Performance," *Administrative Science Quarterly* (44:1), 1999, pp. 1-28.

Pelled, L.H., Xin, K.R., and Weiss "No es como mi: Relational Demography and Conflict in a Mexican Production Facility," *Journal of Occupational and Organizational Psychology* (74:1), 2001, pp. 63-84.

Pfeffer, J. "Organizational demography," In *Research in Organizational Behavior*, B. Staw and L. Cummings (eds.), JAI Press, Greenwich, CT, 1983, pp. 299-357.

Piccoli, G., and Ives, B. "Trust and The Unintended Effects of Bahavior Control in Virtual Teams," *MIS Quarterly* (27:3), 2003, pp. 365-395.

Piccoli, G., Powell, A., and Ives, B. "Virtual Teams: Team Control Structure, Work Processes, And Team Effectiveness," *Information Technology & People* (17:4), 2004, pp. 359-379.

Pinsonneault, A., and Kraemer, K.L. "The Effects of Electronic Meetings on Group Processes and Outcomes: An Assessment of the Empirical Research," *European Journal of Operations Research* (46), 1990, pp. 143-161.

Pinsonneault, A., and Kraemer, K.L. "Survey Research Methodology in Management Information Systems: An Assessement," *Journal of Management Information Systems* (10:2), 1993, pp. 75-105.

Plaks, J.E., and Higgins, E.T. "Pragmatic Use of Stereotyping in Teamwork: Social Loafing and Compensation as a Function of Inferred Partner-situation Fit.," *Journal of Personal and Social Psychology* (79), 2000, pp. 962-967.

Plant, R., and Pons, A.P. "MIS Research Involving Human Subjects: Processes And IRB Requirements," *Communications of the Association for Information Systems* (17), 2006, pp. 404-427.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., and Podsakoff, N.P. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies," *Journal of Applied Psychology* (88:5), 2003, pp. 879-903.

Polzer, J.T., Milton, L.P., and Swann, W.B.J.R. "Capitalizing on Diversity: Interpersonal Congruence in Small Work Groups.," *Administrative Science Quarterly* (47), 2002, pp. 296-324.

Powell, A., Piccoli, G., and Ives, B. "Virtual Teams: A Review of Current Litertaure and Directions for Future Research," *The DATA BASE for Advances in Information Systems* (35:1), 2004, pp. 6-36.

Pritchard, R.D., Jones, S.D., Roth, P.L., Stuebing, K.K., and Ekeberg, S.E. "Effects of Group Feedback, Goal Setting, and Incentives on Organizational Productivity.," *Journal of Applied Psychology* (73), 1988, pp. 337-358.

Quereshi, S., and Zigurs, I. "Paradoxes and Prerogatives in Global Virtual Collaboration," *Communications of the ACM* (44:12), 2001, pp. 85-88.

Qureshi, S., Bogenrieder, Z., and Kumar, K. "Managing Participative Diversity in Virtual Teams: Requirements for Collaborative Technology Support," *Proceedings of the Proceedings of the 33rd Annual Hawaii International Conference on System Sciences*, 2000

Ratcheva, V., and Vyakarnam, S. "A Holistic Approach to Entrepreneurial Team Formation," *The International Journal of Entrepreneurship and Innovation* (October), 2000, pp. 173-182.

Raven, A. "Team or Community of Practice- Aligning Tasks, Structures, and Technologies," In *Virtual Teams That Work: Creating Conditions for Virtual Team Effectiveness*, C. B. G. S. G. Cohen (ed.) Jossey- Bass, San Francisco, 2003, pp. 292-306.

Rice, R.E., and Shook, D.E. "Access to, Usage of, and Ofrom an Electronic Messaging System," *ACM Transactions on Office Information Systems* (6:3), 1988, pp. 255-276.

Rico, R., and Cohen, S.G. "Effects of Task Interdependence and Type of Communication on Performance in Virtual Teams," *Journal of Managerial Psychology* (20:3/4), 2005, pp. 261-274.

Riopelle, K., Gluesing, J.C., Alcordo, T.C., Baba, M., Britt, D., McKether, W., Monplaisir, L., Ratner, H.H., and Wagner, K.H. "Context, Task, And The Evolution Of Technology Use In Global Virtual Teams," In *Virtual Teams That Work: Creating Conditions For Virtual Team Effectiveness*, C. B. Gibson and S. G. Cohen (eds.), Jossey-Bass, San Francisco, 2003, pp. 239-264.

Robey, D., Khoo, H., and Powers, C. "Situated Learning in Cross Functional Virtual Teams," *IEEE Transactions on Professional Communications* (43:1), 2000, pp. 51-66.

Rogelberg, S.G., and Rummery, S.M. "Gender Diversity, Team Decision Quality, Time on Task, and Interpersonal Cohesion," *Small Group Research* (27:1), 1996, pp. 79-90.

Rubaii-Barrett, N., and Beck, A.C. "Minorities in the Majority: Implications for Managing Cultural Diversity," *Public Personnel Management Science* (22:4), 1993, pp. 503-521.

Saavedra, R., P.C.Earley, and Dyne, L.V. "Complex Interdependence in Task-Performing Groups," *Journal of Applied Psychology* (78:1), 1993, pp. 61-72.

Sanna, L.J., and Parks, C.D. "Group Research Trends in Social and Organizational Psychology: Whatever Happened to Intragroup Research?," *Psychological Science* (8:4), 1997, pp. 261–267.

Sarker, S., and Sahay, S. "Information Systems Development by US-Norwegian Virtual Teams: Implications of Time and Space," *Proceedings of the Thirty-Fifth Annual Hawaii International Conference on System Sciences*, Hawaii, 2002, pp. 1-10.

Sarker, S., and Sahay, S. "Understanding Virtual Team Development: An Interpretive Study," *Journal of Association for Information Systems* (4), 2003, pp. 1-38.

Sarker, S., Valacich, J.S., and Sarker, S. "Technology Adoption by Groups:A Valence Perspective," *Journal of the Association for Information Systems* (6:2), 2005, pp. 37-71.

Saunders, C.S. "Virtual teams: Piecing Together the Puzzle," In *Framing the Domain of IT Management: Projecting the Future Through the Past*, R. W. Zmud (ed.) Pinnaflex, Cincinnati, OH, 2000,
Schiller, S.Z., and Mandviwalla, M. "Virtual Team Research An Analysis of Theory Use and a Framework for Theory Appropriation," *Small Group Research* (31:1), 2007, pp. 12-59.

Schwenk, C. "Conflict in Organizational Decision Making: An Exploratory Study of its Effects in for Profit and Not-For-Profit Organizations," *Management Science* (36:4), 1990, pp. 436-448.

Seijts, G.H., Latham, G.P., and Whyte, G. "Effect of Self- and Group Efficacy on Group Performance in a Mixed-Motive Situation," *Human Performance* (13), 2000, pp. 279-298.

Sessa, V.I. "Why Team Demographics Have an Influence on Team Effectiveness: Conflict as a Mediating Variable," *Proceedings of the Annual Meeting of the Academy of Management*, Atlanta, GA., 1993,
Shea, G.P., and Guzzo, R.A. "Group Effectiveness: What Really Matters?," *Sloan Management Review* (28:3), 1987, pp. 25-31.

Simons, T., Pelled, L.H., and Smith, K.A. "Making Use of Difference: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams," *Academy of Management Journal* (42), 1999, pp. 662-673.

Singelis, T.M., Triandis, H.C., Bhawuk, D.P.S., and Gelfand, M.J. "Horizontal and Vertical Dimensions of Individualism and Collectivism: A Theoretical and Measurement Refinement.," *Cross-Cultural Research* (29:3), 1995, pp. 240-275.

Smith, K.A., Smith, K.G., Olian, J.D., Sims, H.P., O'Bannon, D.P., and Scully, J. "Top Management Team Demography and Process: The Role of Social Integration and Communication," *Administrative Science Quarterly* (39), 1994, pp. 412-438.

Sole, D., and Edmondson, A. "Situated Knowledge And Learning In Dispersed Teams," *British Journal of Management* (13), 2002, pp. 517-534.

Solomon, C. "Managing Virtual Teams," *Workforce* (80:6), 2001, pp. 60-65.

Stewart, G.L., and Barrick, M.R. "Team Structure and Performance: Assessing the Mediating Role of Intrateam Process and The Moderating Role of Task Type," *Academy of Management Journal* (43:2), 2000, pp. 135-148.

Stone, R.A. "Workplace Homicide: A Time for Action," *Business Horizon* (34), 1995, pp. 17-20.

Straub, D.W., and Carlson, C.L. "Validating Instruments in MIS Research," *MIS Quarterly* (June), 1989, pp. 147-166.

Straus, S.G., and McGrath, J.E. "Does the Medium Matter? The Interaction of Task Type and Technology on Group Performance and Member Reactions," *Journal of Applied Psychology* (79), 1994, pp. 87-97.

Suchan, J., and Hayzak, G. "The Communication Characteristics of Virtual Teams: A Case Study," *IEEE Transactions on Professional Communications* (44:3), 2001, pp. 174-186.

Sundstrom, E., Meuse, K.P.D., and Futrell, D. "Work Teams: Applications and Effectiveness," *American Psychologist* (45:2), 1990, pp. 120-133.

Tan, B.C.Y., Wei, K., Huang, W.W., and Ng, G.N. "A Dialogue Technique To Enhance Electronic Communication In Virtual Teams," *IEEE Transactions on Professional Communication* (43), 2000, pp. 153-165.

Tan, B.C.Y., Wei, K., Watson, R.T., Clapper, D.L., and McLean, E.R. "Computer-mediated Communication and Majority Influence: Assessing the Impact in an Individualistic and Collectivistic Culture," *Management Science* (44:9), 1998, pp. 1263-1278.

Teasley, S., and Wolinsky, S. "Scientific Collaborations at a Distance," *Science* (292), 2001, pp. 2254-2255.

Teijlingen, E.R., and Handley, V. "The Importance of Pilot Studies," *Social Research Update*:35), 2001,
Thibaut, J.W., and Kelly, H. *The Social Psychology of Groups*, Wiley, New York, 1959.

Timmerman, T.A. "Racial Diversity, Age Diversity, Interdependence, and Team Performance," *Small Group Research* (31:5), 2000, pp. 592-606.

Townsend, A.M., DeMarie, S.M., and Hendrickson, A.R. "Virtual Teams. Technology and the Workplace of The Future," *Academy of Management Executive* (12:3), 1998, pp. 17-29.

Triandis, H.C., McCusker, C., and Hui, C.H. "Multi-Method Probes of Individualism-Collectivism," *Journal of Personality and Social Psychology* (59), 1990, pp. 1006-1020.

Trist, E.L., and Bamforth, K.W. "Some Social and Psychological Consequences of the Longxwall Method of Coal-Getting An Examination of the Psychological Situation and

Defences of a Work Group in Relation to the Social Structure and Technological Content of the Work System," *Human Relations* (4), 1951, pp. 3-38.

Tsui, A.S., Egan, T., and O'Reilly, C.A. "Being Different: Relational Demography and Organizational Attachment," *Administrative Science Quarterly* (37), 1992, pp. 549-579.

Tyran, K.L., Tyran, C.G., and Shepherd, M. "Exploring Emerging Leadership In Virtual Teams," In *Virtual Teams That Work: Creating Conditions For Virtual Team Effectiveness*, C. B. Gibson and S. G. Cohen (eds.), Jossey-Bass, San Francisco, 2003, pp. 183-195.

VanManen, M. *Researching Lived Experience*, State University of New York Press, New York, 1990.

Vegt, G.S.V.D., and Bunderson, J.S. "Learning And Performance In Multidisciplinary Teams: The Importance Of Collective Team Identification," *Academy of Management Journal* (48:3), 2005, pp. 532-547.

Vegt, G.S.V.d., Emans, B.J., and Vliert, E.V.d. "Patterns of Interdependence in Work Teams: a Two-Level Investigation of the Relations With Job and Team Satisfaction," *Personnel Psychology* (54), 2001, pp. 51-69.

Ven, A.H.V.d., and Delbecq, A.L. "A Task Contigent Model of Work Unit Structure," *Administrative Science Quarterley* (19), 1974, pp. 183-197.

Ven, A.H.V.d., and Ferry, D.L. *Measuring and Assessing Organizations*, Chichester, New York, 1980.

Wageman, R. "Interdependence and Group Effectiveness," *Administrative Science Quarterly* (40:1), 1995, pp. 145-180.

Wall, J., and Callister, R. "Conflict and Its Management," *Journal of Management* (21:3), 1995, pp. 515-560.

Walther, J. "Interpersonal Effects in Computer-Mediated Interaction," *Communication Research* (19:1), 1992, pp. 52-91.

Watson, W., Kumar, K., and Michaelsen, L.K. "Cultural Diversity's Impact on Interaction Process and Performance: Comparing Homogenous and Diverse Task Groups," *Academy of Management Journal* (36:3), 1993, pp. 590-602.

Wiersema, M.F., and Bantel, K.A. "Top Management Team Demography and Corporate Strategic Change," *Academy of Management Journal* (35:1), 1992, pp. 91-121.

Williams, K., and O'Reilly, C. "Demography and Diversity in Organizations: A Review of 40 years of Research," *Research in Organization and Behavior* (20), 1998, pp. 77-140.

Wong, S.S., and Burton, R.M. "Virtual Teams: What are their Characteristics, and Impact on Team Performance?," *Computational and Mathematical Organization Theory* (6:4), 2000, pp. 339-360.

Workman, M., Kahnweiler, W., and Bommer, W. "The Effects Of Cognitive Style And Media Richness On Commitment To Telework And Virtual Teams," *Journal of Vocational Behavior* (63), 2003, pp. 199-219.

Wu, S., Lin, C.S., and Lin, T.-C. "Exploring Knowledge Sharing in Virtual Teams:A Social Exchange Theory Perspective," *Proceedings of the Proceedings of the 39th Hawaii International Conference on System Sciences*, 2006,
Yukl, G., Gordon, A., and Taber, T. "A Hierarchical Taxonomy of Leadership Behavior: Integrating a Half Century of Behavior Research," *Journal of Leadership & Organization Studies* (9:1), 2002, pp. 15-32.

Zaccaro, S.J., and Bader, P. "E-Leadership and the Challenges of Leading E-Teams: Minimizing the Bad and Maximizing the Good," *Organizational Dynamics* (31:4), 2003, pp. 377-387.

Zakaria, N., Amelinckx, A., and Wilemon, D. "Working Together or Apart? Building a Knowledge Sharing Culture for Global Virtual Teams," *Creativity and Innovation Management* (13:1), 2004, pp. 15-29.

Zenger, T., and Lawrence, B. "Organizational Demography: The Differential Effects of Age and Tenure Distributions on Technical Communications," *Academy of Management Journal* (32:2), 1989, pp. 353-376.

Zhang, D., Lowry, P.B., Zhou, L., and Fu, X. "The Impact of Individualism-Collectivism, Social Presence, and Group Diversity on Group Decision Making Under Majority Influence," *Journal of Management Information Systems* (23:4), 2007, pp. 53-80.

APPENDICES

APPENDIX A. INSTRUMENT FOR MEMBER RESPONSE

Global Virtual Team Survey

Purpose

The purpose of this survey is to gather information regarding global virtual team of which you are a member. It is important for researchers to understand how global virtual team members think, feel, and function. Only with this knowledge will it be possible to address the issues and areas of concern and recommend potential recommendations for further enhancement in management of global virtual teams.

Your Participation

Your participation involves answering questions regarding your experience in the global virtual team you are a member of. The survey should take less than 15-20 minutes to complete. There are no known or anticipated risks to participation in this study. You will be contributing to the scientific research of global virtual team building. Participation is voluntary and confidential.

In order to accomplish our above stated goals, we need your complete and honest participation. We ensure complete confidentiality for all respondents. The data will be summarized and no individual responses will be identified. The data will be maintained on a password-protected computer database for two years and will be permanently deleted after that. Declining to answer or withdrawing from participation will have no impact on you or your job in any way.

Survey Results

In an effort to keep the involved community informed and create a stronger team management environment, the results from this research study will be summarized in a final report. This report will be shared with all the global virtual teams who participate in this process. Thank you in advance for you cooperation and participation in the research endeavor.

About Us

This study is being conducted by Praveen Pinjani, for his doctoral dissertation, under the supervision of Dr. Prashant Palvia, Dr. Ruth King, Dr. Kevin Lowe and Dr. Hamid Nemati, at the University of North Carolina at Greensboro. If you have any questions about this study, or would like additional information to assist you in reaching a decision about participation, please feel free to contact Praveen Pinjani at p_pinjan@uncg.edu (336.256.0192) or Dr. Prashant Palvia at pcpalvia@uncg.edu (336.334.4818). This study has been reviewed by, and received clearance, through the Institutional Review Board at the University of North Carolina at Greensboro. In case you have any concerns regarding the risks related to the study you can contact Eric Allen, Director, Office of Research Compliance University of North Carolina at Greensboro at ecallen@uncg.edu (336.256.1482).

Directions

Kindly answer all the questions from the perspective of the global virtual team you are a member of. If you currently work on more than one global virtual team, please choose only one team to rate throughout this survey. Answer all questions with that team in mind.

Please follow the instructions on the survey itself and indicate your response appropriately. If a question does not apply to you, leave it blank.

Name of the organization

Name of the work unit

Global Virtual Teams are groups that are identified by their organization(s) and members as a team, are responsible for making and/or implementing decisions, use technology- supported communication substantially more than face-to-face communication and work and live in different countries.

Name of the global virtual team you are referring to in this survey

Provide a brief description of the project the team is currently working on?

Total number of team members on this team

List all the global locations and the number of members in that location for the team.

Location	Number of Members

Your position in relation to this team (Please select only one)

___Team Member
___Team Leader
___External Team supporter
___Team Manager

___Other (Please Specify) _____

How long has this team been in existence? _____
How long have you been a member of this team? _____
Please indicate how often you use the following tools for exchanging routine business information with fellow team members.

0 = Never/Not Applicable
1 = Less than once a month
2 = Once a month
3 = Once a week
4 = A few times a week
5 = Daily

___Face-to-face interaction
___Group Tele-Conference
___Personal telephone call
___Video Conference
___E-Mail
___Shared Database/Groupware (eg. LotusNotes®)

___Others (Please Specify) _____

Please circle your level of agreement with each statement using the following scale.

1 Strongly Disagree	2 Disagree	3 Somewhat Disagree	4 Neutral	5 Somewhat Agree	6 Agree	7 Strongly Agree

No.								
1.	Members of the team are similar in terms of their age.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2.	Members of the team are similar in terms of their ethnic background.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3.	Members of the team are similar in terms of their gender.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4.	Members of the team are similar in terms of their functional expertise.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5.	Members of the team are similar in terms of their educational background.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6.	Members of the team are similar in terms of their length of organizational experience.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7.	Members of the team are similar in terms of their personal values	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8.	Members of the team are similar in terms of their personalities	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9.	Members of the team are similar in terms of their attitudes towards the project	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10.	Members of the team are similar in terms of their attitudes towards project goals	**1**	**2**	**3**	**4**	**5**	**6**	**7**
11.	The well being of fellow team members is important to members of the team.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
12.	It is important for members to maintain harmony within the team.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13.	Members of the team like sharing information with my fellow team members.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
14.	It is important for members to consult other team members before making a decision.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
15.	Members help fellow team members in their time of difficulty.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
16.	Team members share the risk, that can occur during normal business.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
17.	Team members have collective responsibilities for benefits occurring during normal business.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
18.	The team as a whole is awarded or recognized for its collective achievements	**1**	**2**	**3**	**4**	**5**	**6**	**7**
19.	There are clearly defined project goals that are shared among all members.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

	1 Strongly Disagree	2 Disagree	3 Somewhat Disagree	4 Neutral	5 Somewhat Agree	6 Agree	7 Strongly Agree
20.	Shared goals for the team are noble and worthwhile.				1	2	3	4	5	6	7
21.	Shared goals represent an opportunity for exceptional level of achievement.				1	2	3	4	5	6	7
22.	Shared goals challenge individual limits and abilities.				1	2	3	4	5	6	7
23.	There are clear consequences for the team's success or failure in achieving shared goals.				1	2	3	4	5	6	7
24.	Team members collectively agree on goals with other members of the team.				1	2	3	4	5	6	7
25.	Team members in this team are considerate of other's feelings.				1	2	3	4	5	6	7
26.	Team members are friendly towards other.				1	2	3	4	5	6	7
27.	Team members can rely on fellow team members.				1	2	3	4	5	6	7
28.	Members in the team are trustworthy.				1	2	3	4	5	6	7
29.	Members in this team share work reports, methodologies, and official documents within the team.				1	2	3	4	5	6	7
30.	Members of this team share their functional experience and know-how with others on the team.				1	2	3	4	5	6	7
31.	Members of this team share their knowledge from education or training with other members of the team.				1	2	3	4	5	6	7
32.	Personality clashes are evident in the team.				1	2	3	4	5	6	7
33.	Members of this team get along interpersonally.				1	2	3	4	5	6	7
34.	Members of this team disagree about non-work (social/personality) things.				1	2	3	4	5	6	7
35.	There is conflict of ideas among the members of this team.				1	2	3	4	5	6	7
36.	Members of this team have disagreements about the task members are working on.				1	2	3	4	5	6	7
37.	There are disagreements about who should do what in the team.				1	2	3	4	5	6	7
38.	Members of the team disagree about resource (funds, time) allocation within the team.				1	2	3	4	5	6	7
39.	Members of the team have to rely on information or material from other others within the team.				1	2	3	4	5	6	7

	1 Strongly Disagree	2 Disagree	3 Somewhat Disagree	4 Neutral	5 Somewhat Agree	6 Agree	7 Strongly Agree
40.	Tasks performed by team members are related to one another.					1 2 3 4 5 6 7	
41.	Members have to obtain information and advice from other team members in order to complete the assigned task.					1 2 3 4 5 6 7	
42.	Members of the team require technical knowledge to perform the task.					1 2 3 4 5 6 7	
43.	The tasks involve problem solving.					1 2 3 4 5 6 7	
44.	The tasks that team is working on is complex					1 2 3 4 5 6 7	
45.	Members of the team generally encounter variety in tasks, clients.					1 2 3 4 5 6 7	
46.	Members of the team have opportunity to do a number of different tasks.					1 2 3 4 5 6 7	
47.	Members have to adopt different methods and procedures in doing their day-to-day work					1 2 3 4 5 6 7	
48.	Team members are equipped with adequate tools and technologies to perform their tasks.					1 2 3 4 5 6 7	
49.	Technology enables team members to work on different subtasks simultaneously.					1 2 3 4 5 6 7	
50.	Technology enables team members to view other's work whenever mutually desirable.					1 2 3 4 5 6 7	
51.	Technology enables team members to modify other members' work whenever desirable.					1 2 3 4 5 6 7	
52.	Technology enables the development of social relationships among team members.					1 2 3 4 5 6 7	
53.	Technology enables the sharing of knowledge among team members.					1 2 3 4 5 6 7	
54.	In the past, the team has been effective in reaching its goals.					1 2 3 4 5 6 7	
55.	The team, at present, is meeting its business objectives.					1 2 3 4 5 6 7	
56.	Completion of work is generally on time.					1 2 3 4 5 6 7	
57.	Completion of work is generally within the assigned budget.					1 2 3 4 5 6 7	
58.	In the past, the team has been efficient in performing the task.					1 2 3 4 5 6 7	
59.	The team, at present, is producing work of the highest quality.					1 2 3 4 5 6 7	
60.	Each member's input is valued by the team.					1 2 3 4 5 6 7	
61.	The team members' morale is high in this team.					1 2 3 4 5 6 7	
62.	Members enjoy being a part of this team.					1 2 3 4 5 6 7	
63.	Members would be interested in participating in another virtual team in future.					1 2 3 4 5 6 7	

Your position in the organization (Please select only one)

___Administrative/Support
___Manager/Supervisor
___Vice President
___Individual Contributor (Consultant, Sales Rep. etc.)
___Director
___Senior Executive
___ Staff Analyst
___Other (Please Specify) _____

In the last year how many teams have you participated in where all the members were based in the same location? _____

In the last year how many teams you have participated in where some of the members were from different geographic locations? _____

Gender _____M _____F

Age _____Years _____Months

Racial/Ethnic background (your or your parents) (Please Select only one)

___ White or Caucasian
___Black or African American
___Asian
___American Indian or Alaskan Native
___Native Hawaiian or other Pacific Islander
___Hispanic or Latino
___Other (Please Specify) _____

Functional area where you have had most experience (Please select only one)

___Accounting/Finance
___Information Systems
___Customer Service
___Purchasing/Procurement
___Operations
___Human Resources
___Sales & Marketing
___Engineering
___Management
___R&D
___Other (Please Specify) _____

Highest Educational level achieved (Please select only one)

___Doctorate
___Graduate Studies
___Undergraduate Level Studies
___High School or Lower
___Other (Please Specify) _____

Kindly list some of the issues that you feel the global virtual team is facing.

We thank you for participation in completing this survey and appreciate your support towards our research study.

APPENDIX B. INSTRUMENT FOR STAKEHOLDER RESPONSE

Global Virtual Team Survey

Purpose

The purpose of this survey is to gather information regarding global virtual team of which you are/were the manager/leader. It is important for researchers to understand how global virtual team members think, feel, and function. Only with this awareness will it be possible to address and issues and areas of concern and recommend potential recommendations for further enhancement in management of global virtual teams like yours.

Your Participation

Your participation involves answering questions regarding your experience on the global virtual team you are a stakeholder of. The survey should take less than 5-7 minutes to complete. There are no known or anticipated risks to participation in this study. You will be contributing to the scientific research of global virtual team building. Participation is voluntary and confidential.

In order to accomplish our above stated goals, we need your complete and honest participation. For this reason we ensure complete confidentiality for all the respondents. The data will be summarized and no individual responses will be identified for reporting purposes. The data collected will be maintained on a password-protected computer database for two years. Declining to answer or withdrawing from participation will have no impact on you or your job in any way.

Survey Results

In an effort to keep the involved community informed and create a stronger team management environment, the results from this research study will be summarized in a final report. This report will be shared with all the global virtual teams who participate in this process. Thank you in advance for you cooperation and participation in the research endeavor.

About Us

This study is being conducted by Praveen Pinjani under the supervision of Dr. Prashant Palvia, Dr. Ruth King, Dr. Kevin Lowe and Dr. Hamid Nemati, of the Department of Information Systems and Operations Management at University of North Carolina at Greensboro. If you have any questions about this study, or would like additional information to assist you in reaching a decision about participation, please feel free to contact Praveen Pinjani at p_pinjan@uncg.edu or Dr. Prashant Palvia at pcpalvia@uncg.edu. This study has been reviewed by, and received clearance, through the Institutional Review Board at University of North Carolina at Greensboro.

Directions

Kindly answer all the questions from the perspective of the global virtual team that you are a stakeholder of and members of the team are also participating in the study. If you currently manage more than one global virtual team, please choose only one team to rate, the one which is participating throughout this survey. Answer all questions with that team in mind.

Please follow the instructions on the survey itself and indicate your response appropriately. If a question does not apply to you, leave it blank.
Kindly rate the _____ global virtual team on the following questions.

No.		Extremely Low	Somewhat Low	Neutral	Somewhat High	Extremely High
1.	The efficiency of the global virtual team's operations is	( )	( )	( )	( )	( )
2.	The amount of work global virtual team produces is	( )	( )	( )	( )	( )
3.	The global virtual team's adherence to schedule is	( )	( )	( )	( )	( )
4.	The global virtual team's adherence to budgets is	( )	( )	( )	( )	( )
5.	The quality of the work global virtual team produces is	( )	( )	( )	( )	( )
6.	The effectiveness of teams interactions with people outside the team	( )	( )	( )	( )	( )
7.	The teams ability to meet the goals of the project is	( )	( )	( )	( )	( )
8.	The ability of team to do work faster with same level of quality	( )	( )	( )	( )	( )
9.	The ability of the team to meet goals as quickly as possible	( )	( )	( )	( )	( )

10. Name of the organization

11. Name of the work unit

12. Your position in the organization (Please select only one)

___Administrative/Support
___Individual Contributor(Consultant, Sales Rep. etc.)
___Manager/Supervisor
___Director
___Vice President
___Senior Executive

___Other (Please Specify) _____

13. Your position in relation to this team (Please select only one)

___Team Member
___Team Leader
___External Team supporter
___Team Manager

___Other (Please Specify) _____

14. How long have you been observing this team? _____

We thank you for participation in completing this survey and appreciate your support towards our research study.

APPENDIX C. IRB APPROVAL

THE UNIVERSITY of NORTH CAROLINA
GREENSBORO

Office of Research Compliance

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November 20, 2006

Ms. Pinjani Praveen
In care of Dr. Prashant Palvia
Information Systems and Operations
475 Bryan Building
Refer to: IRB No. 067110

Dear Ms. Praveen,

As required by University policy a member of the UNCG IRB has given your research protocol entitled "Diversity in Global Virtual Teams: A Partnership Development Perspective" (IRB No. 067110) an exempt review as permitted under UNCG's Federal Wide Assurance (FWA 00000216). Your minimal risk protocol has been deemed exempt under section B2 of 45 CFR 46.101. Exemption B2 Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human participants can be identified, directly or through identifiers linked to the participants; and (ii) any disclosure of the human participants' responses outside the research could reasonably place the participants at risk of criminal or civil liability or be damaging to the participants' financial standing, employability, or reputation.

You should be aware that any changes in your protocol must be approved by the IRB prior to being implemented. Likewise, any problems, complaints or injuries that arise during the course of your project which involves human participants must be reported promptly to the Office of Research Compliance. The approved informed consent form is attached. This version must be used when obtaining informed consent as outlined in this protocol but stamp does not need to appear on the form.

This research protocol is valid for the duration of the study unless changes are made which remove the exempt status. You will not receive a continuing review form to keep this protocol active. Thank you for your cooperation on this matter and best wishes on your project.

Sincerely,

Eric Allen, Director
Office of Research Compliance

Cc:

APPENDIX C1. PROJECT DESCRIPTION SUBMITTED TO IRB, UNCG

Project Description

The purpose and aim of this study is to design a normative framework to assist organizations in implementing diverse Global Virtual Teams (GVT), with specific focus on understanding the impact of member diversity and collaborative technology on team effectiveness. In this regard, this research will aim at developing and empirically testing a comprehensive model for GVT effectiveness based on development of collaborative partnership among diverse team members. Further, the research will also aim towards understanding the moderating role of collaborative technology and task interdependence on the relationship between diverse team members and collaborative partnership elements.

Primary research question: How can a diverse GVT be made more effective?

Sub Questions:

5. What is the effect of member diversity on collaborative partnership in GVTs?
6. What is the effect of collaborative partnership on GVT effectiveness?
7. How does collaborative technology moderate the relationship between member diversity and collaborative partnership in GVT?
8. How does the task interdependence moderate the relationship between member diversity and collaborative partnership in GVT?

The data collection procedure for this study involves collection of responses from about 60-70 GVT in organizations. Using the "informant sampling approach" responses would be solicited from some members of the team. To gain access to organizations personal contacts will be utilized, the contact person would be asked to direct the researcher to senior executives. Approval of the organization to participate in the study will be taken from the senior executive and a list of teams and team members would be asked. Members would be approached through email and asked to fill up a web based survey.

Web based online survey would be created using the software provided by www.zipsurvey.com.[2] An email containing the link of the survey will be mailed to the respondent. The email would explicitly state a short narrative about the purpose of the study and contain the text that "By clicking on the link, I am providing my consent for participation in the study".

After the completion of target response rate the survey would be removed from the website and data would be exported in MS Excel file to a password protected computer. Data will be permanently deleted from the computer after 3 years.

This study qualifies for the exemption under point number 2 of the application form, Research involving the use of educational tests such as survey procedures. Respondents/ human

[2] ZipSurvey™ online survey software by CorporateSurvey.com is a web-hosted research application developed and supported by Ph.D. level I/O psychologists for business and HR consultants, market researchers, professionals, students or anyone interested in conducting online research quickly and affordably. ZipSurvey™ enables you to create online surveys quickly and easily using a completely point-and-click user-interface. Zip Survey offers anonymous surveys with their privacy protocol and SSL Encryption of data while in transit and storage.

participants cannot be individually be identified directly or through identifiers linked to the participants. All the responses would be aggregated at the team level and only teams can be identified. The risks to the participants are non-existent.

Attached are the following documents

1. Certificate of training for PI
2. Certificate of training for Faculty Sponsor
3. Paper replica of the survey instrument

APPENDIX D. MTMM MATRIX

Correlations										
Item	AGE	ETHNIC	GENDER	FUNCEXP	EDUBG	ORGEXP	PERSONA	ATTPRJ	ATTPRJG	WELLFEL
AGE	1.000	0.416	0.233	0.339	0.426	0.173	0.086	0.115	0.101	0.137
ETHNICITY	**0.416**	1.000	0.591	0.333	0.294	0.386	-0.047	-0.023	-0.054	-0.112
GENDER	0.233	**0.591**	1.000	0.264	0.245	0.255	-0.077	-0.040	-0.067	-0.106
FUNCEXP	0.339	0.333	0.264	1.000	0.711	0.532	0.163	0.196	0.146	0.181
EDUBG	0.426	0.294	0.245	**0.711**	1.000	0.535	0.215	0.254	0.189	0.177
ORGEXP	0.173	0.386	0.255	0.532	**0.535**	1.000	0.133	0.180	0.124	0.157
PERSONALITY	0.086	-0.047	-0.077	0.163	0.215	**0.133**	1.000	0.835	0.738	0.652
ATTPRJ	0.115	-0.023	-0.040	0.196	0.254	0.180	**0.835**	1.000	0.857	0.675
ATTPRJGLS	0.101	-0.054	-0.067	0.146	0.189	0.124	0.738	**0.857**	1.000	0.755
WELLFELLMEM	0.137	-0.112	-0.106	0.181	0.177	0.157	0.652	0.675	**0.755**	1.000
MAINHARM	0.109	-0.101	-0.085	0.191	0.190	0.117	0.556	0.635	0.650	**0.749**
LIKESHINFO	-0.057	-0.180	-0.203	0.045	0.081	0.084	0.522	0.544	0.626	0.628
LIKECNSLTG	0.022	-0.126	-0.140	-0.095	-0.023	0.096	0.521	0.480	0.571	0.626
HELPFELL	0.057	-0.177	-0.229	0.008	0.087	-0.009	0.434	0.410	0.471	0.577
MBMEMSHRISK	0.169	0.345	0.212	0.242	0.121	0.226	-0.188	-0.216	-0.270	-0.292
MBMEMCOLLRESP	0.137	0.294	0.180	0.229	0.104	0.169	-0.195	-0.181	-0.198	-0.292
MBTEAMAWD	0.184	0.266	0.207	0.284	0.124	0.239	-0.190	-0.170	-0.213	-0.204
SGCLDEF	0.133	0.389	0.158	0.165	0.065	0.116	-0.275	-0.259	-0.323	-0.318
SGNOBWORTH	0.062	0.302	0.157	0.271	0.138	0.290	-0.195	-0.150	-0.261	-0.256
SGACHOPP	0.161	0.345	0.182	0.173	0.041	0.219	-0.211	-0.241	-0.311	-0.338
SGCHLLABL	0.118	0.347	0.160	0.227	0.069	0.214	-0.218	-0.197	-0.220	-0.320
SGCLCONSEQ	0.215	0.291	0.258	0.134	0.093	0.210	-0.290	-0.263	-0.313	-0.309
SGCOLLAGG	0.128	0.083	0.073	0.255	0.214	0.265	-0.210	-0.204	-0.311	-0.236
MTCONSIDFEEL	0.229	0.373	0.133	0.202	0.095	0.215	-0.194	-0.214	-0.299	-0.335
MTMEMFRND	0.105	0.299	0.106	0.175	0.060	0.106	-0.261	-0.244	-0.295	-0.403
MTMEMREL	0.238	0.373	0.261	0.178	0.139	0.238	-0.267	-0.238	-0.333	-0.354
MTMEMTRSTWORTH	0.189	0.297	0.074	0.025	0.053	0.171	-0.252	-0.235	-0.258	-0.280
SKSHDOCS	0.222	0.438	0.241	0.239	0.107	0.292	-0.172	-0.194	-0.247	-0.277
SKEXPKH	0.126	0.353	0.168	0.208	0.046	0.172	-0.249	-0.229	-0.196	-0.318
SKSK	0.174	0.330	0.230	0.150	0.052	0.200	-0.306	-0.292	-0.270	-0.289
COPERCLASEHS	-0.076	-0.021	-0.045	-0.002	0.057	0.017	0.074	0.095	0.156	0.131
COINTERPERS	-0.031	-0.024	0.027	-0.030	-0.031	-0.042	0.064	0.066	0.132	0.142
CODISNONWORK	0.129	0.006	-0.104	0.156	0.111	0.153	0.161	0.208	0.218	0.235
COIDEAS	0.149	-0.057	-0.219	0.069	0.093	0.081	0.129	0.179	0.241	0.267
CODISTASKS	-0.113	-0.161	-0.110	-0.017	0.082	0.014	0.145	0.128	0.177	0.195
CODISRESP	-0.210	-0.189	-0.121	-0.126	-0.105	0.060	0.095	0.086	0.115	0.167
CODISRESOUR	-0.077	-0.024	0.067	0.023	-0.024	-0.026	0.127	0.091	0.108	0.130
TIRELYINFO	0.158	0.351	0.159	0.222	0.103	0.248	-0.225	-0.253	-0.291	-0.345
TITASKRELA	0.113	0.296	0.158	0.249	0.124	0.207	-0.259	-0.230	-0.217	-0.314
TIOBINFO	0.225	0.310	0.228	0.218	0.141	0.271	-0.203	-0.179	-0.228	-0.239
TCREQTECH	0.125	0.369	0.224	0.265	0.189	0.084	-0.153	-0.119	-0.100	-0.191
TCPS	-0.039	0.091	0.136	0.308	0.376	0.278	-0.017	0.019	0.063	-0.014
TCCT	0.125	0.201	0.001	0.190	0.227	0.198	-0.039	-0.006	-0.055	0.023
TVENCVAR	0.020	0.174	0.112	0.061	0.075	0.075	-0.114	-0.078	-0.103	-0.118
TVDIFFOPP	-0.209	-0.050	0.012	-0.038	-0.067	-0.003	-0.173	-0.155	-0.168	-0.126
TVDIFFMETH	-0.112	0.066	0.015	0.145	0.062	0.067	-0.175	-0.179	-0.238	-0.173
CTEQP	0.313	0.220	0.163	0.311	0.410	0.210	-0.050	-0.042	-0.129	-0.099
CTPARATASK	0.168	0.442	0.332	0.343	0.114	0.169	-0.203	-0.151	-0.159	-0.232
CTVIEWOTH	0.261	0.424	0.275	0.322	0.270	0.326	-0.149	-0.117	-0.101	-0.202
CTMODIFY	0.215	0.211	0.160	0.383	0.302	0.351	0.028	0.035	0.007	0.039
CTSOCRELN	0.076	0.128	0.169	0.184	0.204	0.195	-0.177	-0.162	-0.165	-0.230
CTKS	0.108	0.374	0.196	0.482	0.346	0.433	-0.090	-0.062	-0.132	-0.170

MAINHAI	LIKESHIN	LIKECNS	HELPFELL	MBMEM	MBMEMO	MBTEAM	SGCLDE	SGNOBV	SGACH	SGCHLL	SGCLCO	SGCOLL	MTCONS
0.109	-0.057	0.022	0.057	0.169	0.137	0.184	0.133	0.062	0.161	0.118	0.215	0.128	0.229
-0.101	-0.180	-0.126	-0.177	0.345	0.294	0.266	0.389	0.302	0.345	0.347	0.291	0.083	0.373
-0.085	-0.203	-0.140	-0.229	0.212	0.180	0.207	0.158	0.157	0.182	0.160	0.258	0.073	0.133
0.191	0.045	-0.095	0.008	0.242	0.229	0.284	0.165	0.271	0.173	0.227	0.134	0.255	0.202
0.190	0.081	-0.023	0.087	0.121	0.104	0.124	0.065	0.138	0.041	0.069	0.093	0.214	0.095
0.117	0.084	0.096	-0.009	0.226	0.169	0.239	0.116	0.290	0.219	0.214	0.210	0.265	0.215
0.556	0.522	0.521	0.434	-0.188	-0.195	-0.190	-0.275	-0.195	-0.211	-0.218	-0.290	-0.210	-0.194
0.635	0.544	0.480	0.410	-0.216	-0.181	-0.170	-0.259	-0.150	-0.241	-0.197	-0.263	-0.204	-0.214
0.650	0.626	0.571	0.471	-0.270	-0.198	-0.213	-0.323	-0.261	-0.311	-0.220	-0.313	-0.311	-0.299
0.749	0.628	0.626	0.577	-0.292	-0.292	-0.204	-0.318	-0.256	-0.338	-0.320	-0.309	-0.236	-0.335
1.000	0.759	0.633	0.577	-0.288	-0.216	-0.181	-0.239	-0.169	-0.319	-0.241	-0.269	-0.147	-0.297
0.759	1.000	0.719	0.647	-0.352	-0.289	-0.253	-0.350	-0.207	-0.375	-0.318	-0.340	-0.221	-0.372
0.633	**0.719**	1.000	0.727	-0.285	-0.298	-0.250	-0.235	-0.178	-0.291	-0.294	-0.225	-0.222	-0.291
0.577	0.647	**0.727**	1.000	-0.369	-0.398	-0.313	-0.282	-0.264	-0.408	-0.420	-0.295	-0.236	-0.364
-0.288	-0.352	-0.285	-0.369	1.000	0.772	0.674	0.633	0.587	0.849	0.644	0.699	0.509	0.836
-0.216	-0.289	-0.298	-0.398	**0.772**	1.000	0.595	0.574	0.533	0.682	0.858	0.591	0.522	0.686
-0.181	-0.253	-0.250	-0.313	0.674	**0.595**	1.000	0.537	0.631	0.695	0.604	0.802	0.553	0.618
-0.239	-0.350	-0.235	-0.282	0.633	0.574	**0.537**	1.000	0.747	0.674	0.547	0.611	0.516	0.614
-0.169	-0.207	-0.178	-0.264	0.587	0.533	0.631	**0.747**	1.000	0.651	0.603	0.583	0.526	0.570
-0.319	-0.375	-0.291	-0.408	0.849	0.682	0.695	0.674	**0.651**	1.000	0.706	0.697	0.518	0.844
-0.241	-0.318	-0.294	-0.420	0.644	0.858	0.604	0.547	0.603	**0.706**	1.000	0.541	0.489	0.637
-0.269	-0.340	-0.225	-0.295	0.699	0.591	0.802	0.611	0.583	0.697	**0.541**	1.000	0.584	0.655
-0.147	-0.221	-0.222	-0.236	0.509	0.522	0.553	0.516	0.526	0.518	0.489	**0.584**	1.000	0.575
-0.297	-0.372	-0.291	-0.364	0.836	0.686	0.618	0.614	0.570	0.844	0.637	0.655	**0.575**	1.000
-0.289	-0.397	-0.344	-0.410	0.586	0.752	0.537	0.544	0.519	0.643	0.849	0.572	0.476	**0.681**
-0.249	-0.386	-0.307	-0.366	0.678	0.616	0.783	0.615	0.637	0.676	0.602	0.825	0.582	0.728
-0.236	-0.332	-0.212	-0.335	0.561	0.518	0.559	0.553	0.525	0.626	0.565	0.628	0.476	0.654
-0.288	-0.354	-0.251	-0.383	0.824	0.677	0.681	0.626	0.632	0.907	0.707	0.682	0.526	0.806
-0.242	-0.330	-0.288	-0.414	0.634	0.850	0.565	0.564	0.548	0.681	0.944	0.549	0.460	0.616
-0.276	-0.367	-0.278	-0.325	0.696	0.624	0.774	0.625	0.600	0.690	0.639	0.815	0.547	0.681
0.095	0.113	0.056	0.060	-0.105	-0.147	-0.173	-0.070	-0.177	-0.135	-0.104	-0.095	-0.256	-0.150
0.113	0.099	0.063	0.017	-0.132	-0.116	-0.160	-0.096	-0.203	-0.141	-0.089	-0.140	-0.296	-0.185
0.194	0.176	0.096	0.017	-0.043	-0.036	-0.105	-0.092	-0.053	-0.077	-0.042	-0.184	-0.259	-0.036
0.225	0.168	0.146	0.140	-0.048	-0.060	-0.118	-0.045	-0.132	-0.138	-0.080	-0.124	-0.236	-0.079
0.072	0.122	0.135	0.103	-0.082	-0.184	-0.253	-0.076	-0.079	-0.175	-0.231	-0.206	-0.201	-0.160
0.097	0.212	0.137	0.121	-0.155	-0.221	-0.242	-0.220	-0.160	-0.207	-0.209	-0.211	-0.181	-0.221
0.200	0.279	0.152	0.157	-0.197	-0.255	-0.134	-0.233	-0.080	-0.149	-0.219	-0.181	-0.192	-0.196
-0.350	-0.373	-0.295	-0.378	0.716	0.625	0.566	0.502	0.543	0.805	0.692	0.574	0.477	0.802
-0.240	-0.319	-0.273	-0.396	0.618	0.754	0.526	0.510	0.567	0.666	0.881	0.544	0.440	0.623
-0.218	-0.324	-0.254	-0.324	0.574	0.525	0.703	0.457	0.598	0.603	0.605	0.654	0.529	0.614
-0.153	-0.115	-0.292	-0.290	0.401	0.506	0.416	0.312	0.318	0.386	0.537	0.305	0.334	0.418
0.011	0.074	-0.132	-0.120	0.296	0.346	0.327	0.151	0.301	0.279	0.327	0.209	0.351	0.303
0.044	-0.029	0.002	0.021	0.234	0.144	0.267	0.276	0.267	0.236	0.148	0.265	0.256	0.232
-0.099	-0.105	-0.138	-0.222	0.410	0.463	0.186	0.379	0.317	0.324	0.385	0.329	0.328	0.352
-0.010	0.025	-0.016	-0.066	0.225	0.266	0.126	0.243	0.310	0.162	0.208	0.283	0.371	0.185
-0.126	-0.091	-0.128	-0.127	0.235	0.215	0.404	0.279	0.352	0.294	0.240	0.381	0.399	0.277
-0.041	-0.114	-0.117	-0.046	0.341	0.262	0.494	0.385	0.283	0.393	0.213	0.472	0.371	0.372
-0.142	-0.185	-0.255	-0.246	0.479	0.505	0.494	0.449	0.477	0.455	0.532	0.456	0.229	0.454
-0.120	-0.156	-0.183	-0.236	0.480	0.545	0.469	0.464	0.471	0.458	0.572	0.502	0.319	0.494
0.012	-0.133	-0.069	-0.098	0.406	0.261	0.360	0.261	0.302	0.351	0.325	0.371	0.314	0.355
-0.227	-0.292	-0.192	-0.197	0.502	0.413	0.489	0.472	0.353	0.413	0.394	0.557	0.425	0.402
-0.156	-0.146	-0.317	-0.257	0.548	0.484	0.545	0.423	0.467	0.504	0.486	0.545	0.452	0.504

MTMEMF	MTMEMF	MTMEMT	SKSHDO	SKEXPKH	SKSK	COPERC	COINTEF	CODISNC	COIDEAS	CODISTA	CODISRI	CODISRE	TIRELYI
0.105	0.238	0.189	0.222	0.126	0.174	-0.076	-0.031	0.129	0.149	-0.113	-0.210	-0.077	0.158
0.299	0.373	0.297	0.438	0.353	0.330	-0.021	-0.024	0.006	-0.057	-0.161	-0.189	-0.024	0.351
0.106	0.261	0.074	0.241	0.168	0.230	-0.045	0.027	-0.104	-0.219	-0.110	-0.121	0.067	0.159
0.175	0.178	0.025	0.239	0.208	0.150	-0.002	-0.030	0.156	0.069	-0.017	-0.126	0.023	0.222
0.060	0.139	0.053	0.107	0.046	0.052	0.057	-0.031	0.111	0.093	0.082	-0.105	-0.024	0.103
0.106	0.238	0.171	0.292	0.172	0.200	0.017	-0.042	0.153	0.081	0.014	0.060	-0.026	0.248
-0.261	-0.267	-0.252	-0.172	-0.249	-0.306	0.074	0.064	0.161	0.129	0.145	0.095	0.127	-0.225
-0.244	-0.238	-0.235	-0.194	-0.229	-0.292	0.095	0.066	0.208	0.179	0.128	0.086	0.091	-0.253
-0.295	-0.333	-0.258	-0.247	-0.196	-0.270	0.156	0.132	0.218	0.241	0.177	0.115	0.108	-0.291
-0.403	-0.354	-0.280	-0.277	-0.318	-0.289	0.131	0.142	0.235	0.267	0.195	0.167	0.130	-0.345
-0.289	-0.249	-0.236	-0.288	-0.242	-0.276	0.095	0.113	0.194	0.225	0.072	0.097	0.200	-0.350
-0.397	-0.386	-0.332	-0.354	-0.330	-0.367	0.113	0.099	0.176	0.168	0.122	0.212	0.279	-0.373
-0.344	-0.307	-0.212	-0.251	-0.288	-0.278	0.056	0.063	0.096	0.146	0.135	0.137	0.152	-0.295
-0.410	-0.366	-0.335	-0.383	-0.414	-0.325	0.060	0.017	0.017	0.140	0.103	0.121	0.157	-0.378
0.586	0.678	0.561	0.824	0.634	0.696	-0.105	-0.132	-0.043	-0.048	-0.082	-0.155	-0.197	0.716
0.752	0.616	0.518	0.677	0.850	0.624	-0.147	-0.116	-0.036	-0.060	-0.184	-0.221	-0.255	0.625
0.537	0.783	0.559	0.681	0.565	0.774	-0.173	-0.160	-0.105	-0.118	-0.253	-0.242	-0.134	0.566
0.544	0.615	0.553	0.626	0.564	0.625	-0.070	-0.096	-0.092	-0.045	-0.076	-0.220	-0.233	0.502
0.519	0.637	0.525	0.632	0.548	0.600	-0.177	-0.203	-0.053	-0.132	-0.079	-0.160	-0.080	0.543
0.643	0.676	0.626	0.907	0.681	0.690	-0.135	-0.141	-0.077	-0.138	-0.175	-0.207	-0.149	0.805
0.849	0.602	0.565	0.707	0.944	0.639	-0.104	-0.089	-0.042	-0.080	-0.231	-0.209	-0.219	0.692
0.572	0.825	0.628	0.682	0.549	0.815	-0.095	-0.140	-0.184	-0.124	-0.206	-0.211	-0.181	0.574
0.476	0.582	0.476	0.526	0.460	0.547	-0.256	-0.296	-0.259	-0.236	-0.201	-0.181	-0.192	0.477
0.681	0.728	0.654	0.806	0.616	0.681	-0.150	-0.185	-0.036	-0.079	-0.160	-0.221	-0.196	0.802
1.000	0.640	0.569	0.573	0.853	0.610	-0.112	-0.099	-0.091	-0.063	-0.250	-0.258	-0.235	0.629
0.640	1.000	0.727	0.671	0.597	0.875	-0.170	-0.209	-0.132	-0.131	-0.266	-0.233	-0.193	0.604
0.569	**0.727**	1.000	0.628	0.563	0.678	-0.105	-0.107	-0.057	-0.052	-0.117	-0.156	-0.200	0.570
0.573	0.671	**0.628**	1.000	0.725	0.703	-0.121	-0.157	-0.041	-0.137	-0.133	-0.209	-0.125	0.796
0.853	0.597	0.563	**0.725**	1.000	0.696	-0.120	-0.123	-0.047	-0.071	-0.209	-0.204	-0.183	0.671
0.610	0.875	0.678	0.703	**0.696**	1.000	-0.129	-0.202	-0.128	-0.096	-0.214	-0.174	-0.119	0.651
-0.112	-0.170	-0.105	-0.121	-0.120	-0.129	1.000	0.787	0.493	0.404	0.502	0.514	0.328	-0.121
-0.099	-0.209	-0.107	-0.157	-0.123	-0.202	**0.787**	1.000	0.481	0.371	0.369	0.385	0.277	-0.143
-0.091	-0.132	-0.057	-0.041	-0.047	-0.128	0.493	**0.481**	1.000	0.638	0.409	0.369	0.374	-0.059
-0.063	-0.131	-0.052	-0.137	-0.071	-0.096	0.404	0.371	**0.638**	1.000	0.442	0.334	0.146	-0.115
-0.250	-0.266	-0.117	-0.133	-0.209	-0.214	0.502	0.369	0.409	**0.442**	1.000	0.700	0.486	-0.153
-0.258	-0.233	-0.156	-0.209	-0.204	-0.174	0.514	0.385	0.369	0.334	**0.700**	1.000	0.696	-0.153
-0.235	-0.193	-0.200	-0.125	-0.183	-0.119	0.328	0.277	0.374	0.146	0.486	**0.696**	1.000	-0.131
0.629	0.604	0.570	0.796	0.671	0.651	-0.121	-0.143	-0.059	-0.115	-0.153	-0.153	-0.131	1.000
0.821	0.550	0.520	0.661	0.873	0.630	-0.071	-0.061	-0.027	-0.043	-0.204	-0.197	-0.172	**0.769**
0.502	0.724	0.566	0.667	0.571	0.743	-0.146	-0.182	-0.105	-0.166	-0.261	-0.208	-0.136	0.715
0.487	0.330	0.326	0.406	0.525	0.315	-0.053	-0.041	-0.078	-0.064	-0.128	-0.146	-0.105	0.448
0.191	0.234	0.192	0.292	0.325	0.289	-0.079	-0.122	-0.051	0.015	0.023	-0.016	-0.045	0.389
0.062	0.273	0.243	0.281	0.160	0.323	-0.078	-0.123	-0.101	0.004	0.002	-0.045	-0.094	0.282
0.325	0.298	0.228	0.316	0.369	0.300	-0.054	-0.079	-0.101	-0.010	-0.003	-0.044	-0.136	0.275
0.210	0.221	0.211	0.162	0.210	0.216	-0.066	-0.016	-0.159	-0.103	0.027	0.016	-0.070	0.143
0.226	0.305	0.261	0.307	0.194	0.311	-0.110	-0.118	-0.137	-0.143	-0.028	-0.081	0.003	0.265
0.220	0.462	0.335	0.385	0.210	0.400	-0.037	-0.104	-0.065	0.030	-0.057	-0.175	-0.115	0.282
0.451	0.451	0.341	0.518	0.542	0.496	-0.054	-0.086	0.029	0.016	-0.110	-0.212	-0.133	0.466
0.515	0.472	0.391	0.568	0.595	0.471	0.019	-0.053	0.125	0.086	-0.030	-0.231	-0.192	0.430
0.229	0.347	0.314	0.438	0.332	0.377	-0.018	-0.042	0.044	0.061	0.051	0.000	-0.072	0.294
0.357	0.498	0.410	0.481	0.427	0.507	-0.016	-0.074	-0.179	-0.006	-0.021	-0.055	-0.280	0.333
0.444	0.568	0.445	0.570	0.510	0.595	-0.026	-0.106	0.039	-0.014	-0.073	-0.068	-0.022	0.480

TITASKR	TIOBINF	TCREQTE	TCPS	TCCT	TVENCVA	TVDIFFO	TVDIFFM	CTEQP	CTPARA	CTVIEW	CTMODI	CTSOCR	CTKS
0.113	0.225	0.125	-0.039	0.125	0.020	-0.209	-0.112	0.313	0.168	0.261	0.215	0.076	0.108
0.296	0.310	0.369	0.091	0.201	0.174	-0.050	0.066	0.220	0.442	0.424	0.211	0.128	0.374
0.158	0.228	0.224	0.136	0.001	0.112	0.012	0.015	0.163	0.332	0.275	0.160	0.169	0.196
0.249	0.218	0.265	0.308	0.190	0.061	-0.038	0.145	0.311	0.343	0.322	0.383	0.184	0.482
0.124	0.141	0.189	0.376	0.227	0.075	-0.067	0.062	0.410	0.114	0.270	0.302	0.204	0.346
0.207	0.271	0.084	0.278	0.198	0.075	-0.003	0.067	0.210	0.169	0.326	0.351	0.195	0.433
-0.259	-0.203	-0.153	-0.017	-0.039	-0.114	-0.173	-0.175	-0.050	-0.203	-0.149	0.028	-0.177	-0.090
-0.230	-0.179	-0.119	0.019	-0.006	-0.078	-0.155	-0.179	-0.042	-0.151	-0.117	0.035	-0.162	-0.062
-0.217	-0.228	-0.100	0.063	-0.055	-0.103	-0.168	-0.238	-0.129	-0.159	-0.101	0.007	-0.165	-0.132
-0.314	-0.239	-0.191	-0.014	0.023	-0.118	-0.126	-0.173	-0.099	-0.232	-0.202	0.039	-0.230	-0.170
-0.240	-0.218	-0.153	0.011	0.044	-0.099	-0.010	-0.126	-0.041	-0.142	-0.120	0.012	-0.227	-0.156
-0.319	-0.324	-0.115	0.074	-0.029	-0.105	0.025	-0.091	-0.114	-0.185	-0.156	-0.133	-0.292	-0.146
-0.273	-0.254	-0.292	-0.132	0.002	-0.138	-0.016	-0.128	-0.117	-0.255	-0.183	-0.069	-0.192	-0.317
-0.396	-0.324	-0.290	-0.120	0.021	-0.222	-0.066	-0.127	-0.046	-0.246	-0.236	-0.098	-0.197	-0.257
0.618	0.574	0.401	0.296	0.234	0.410	0.225	0.235	0.341	0.479	0.480	0.406	0.502	0.548
0.754	0.525	0.506	0.346	0.144	0.463	0.266	0.215	0.262	0.505	0.545	0.261	0.413	0.484
0.526	0.703	0.416	0.327	0.267	0.186	0.126	0.404	0.494	0.494	0.469	0.360	0.489	0.545
0.510	0.457	0.312	0.151	0.276	0.379	0.243	0.279	0.385	0.449	0.464	0.261	0.472	0.423
0.567	0.598	0.318	0.301	0.267	0.317	0.310	0.352	0.283	0.477	0.471	0.302	0.353	0.467
0.666	0.603	0.386	0.279	0.236	0.324	0.162	0.294	0.393	0.455	0.458	0.351	0.413	0.504
0.881	0.605	0.537	0.327	0.148	0.385	0.208	0.240	0.213	0.532	0.572	0.325	0.394	0.486
0.544	0.654	0.305	0.209	0.265	0.329	0.283	0.381	0.472	0.456	0.502	0.371	0.557	0.545
0.440	0.529	0.334	0.351	0.256	0.328	0.371	0.399	0.371	0.229	0.319	0.314	0.425	0.452
0.623	0.614	0.418	0.303	0.232	0.352	0.185	0.277	0.372	0.454	0.494	0.355	0.402	0.504
0.821	0.502	0.487	0.191	0.062	0.325	0.210	0.226	0.220	0.451	0.515	0.229	0.357	0.444
0.550	0.724	0.330	0.234	0.273	0.298	0.221	0.305	0.462	0.451	0.472	0.347	0.498	0.568
0.520	0.566	0.326	0.192	0.243	0.228	0.211	0.261	0.335	0.341	0.391	0.314	0.410	0.445
0.661	0.667	0.406	0.292	0.281	0.316	0.162	0.307	0.385	0.518	0.568	0.438	0.481	0.570
0.873	0.571	0.525	0.325	0.160	0.369	0.210	0.194	0.210	0.542	0.595	0.332	0.427	0.510
0.630	0.743	0.315	0.289	0.323	0.300	0.216	0.311	0.400	0.496	0.471	0.377	0.507	0.595
-0.071	-0.146	-0.053	-0.079	-0.078	-0.054	-0.066	-0.110	-0.037	-0.054	0.019	-0.018	-0.016	-0.026
-0.061	-0.182	-0.041	-0.122	-0.123	-0.079	-0.016	-0.118	-0.104	-0.086	-0.053	-0.042	-0.074	-0.106
-0.027	-0.105	-0.078	-0.051	-0.101	-0.101	-0.159	-0.137	-0.065	0.029	0.125	0.044	-0.179	0.039
-0.043	-0.166	-0.064	0.015	0.004	-0.010	-0.103	-0.143	0.030	0.016	0.086	0.061	-0.006	-0.014
-0.204	-0.261	-0.128	0.023	0.002	-0.003	0.027	-0.028	-0.057	-0.110	-0.030	0.051	-0.021	-0.073
-0.197	-0.208	-0.146	-0.016	-0.045	-0.044	0.016	-0.081	-0.175	-0.212	-0.231	0.000	-0.055	-0.068
-0.172	-0.136	-0.105	-0.045	-0.094	-0.136	-0.070	0.003	-0.115	-0.133	-0.192	-0.072	-0.280	-0.022
0.769	0.715	0.448	0.389	0.282	0.275	0.143	0.265	0.282	0.466	0.430	0.294	0.333	0.480
1.000	0.681	0.505	0.338	0.167	0.323	0.192	0.197	0.159	0.499	0.515	0.276	0.346	0.449
0.681	1.000	0.339	0.272	0.313	0.222	0.122	0.299	0.289	0.427	0.398	0.329	0.339	0.437
0.505	**0.339**	1.000	0.513	0.304	0.408	0.280	0.409	0.230	0.506	0.453	0.283	0.357	0.472
0.338	0.272	**0.513**	1.000	0.355	0.297	0.294	0.219	0.366	0.413	0.372	0.290	0.328	0.391
0.167	0.313	0.304	**0.355**	1.000	0.237	0.304	0.458	0.347	0.231	0.186	0.345	0.245	0.269
0.323	0.222	0.408	0.297	**0.237**	1.000	0.445	0.194	0.149	0.310	0.353	0.274	0.309	0.322
0.192	0.122	0.280	0.294	0.304	**0.445**	1.000	0.473	0.107	0.170	0.156	0.160	0.262	0.166
0.197	0.299	0.409	0.219	0.458	0.194	**0.473**	1.000	0.326	0.353	0.303	0.356	0.281	0.357
0.159	0.289	0.230	0.366	0.347	0.149	0.107	0.326	1.000	0.455	0.403	0.330	0.520	0.491
0.499	0.427	0.506	0.413	0.231	0.310	0.170	0.353	**0.455**	1.000	0.781	0.448	0.445	0.587
0.515	0.398	0.453	0.372	0.186	0.353	0.156	0.303	0.403	**0.781**	1.000	0.601	0.538	0.585
0.276	0.329	0.283	0.290	0.345	0.274	0.160	0.356	0.330	0.448	**0.601**	1.000	0.551	0.534
0.346	0.339	0.357	0.328	0.245	0.309	0.262	0.281	0.520	0.445	0.538	**0.551**	1.000	0.532
0.449	0.437	0.472	0.391	0.269	0.322	0.166	0.357	0.491	0.587	0.585	0.534	**0.532**	1.000